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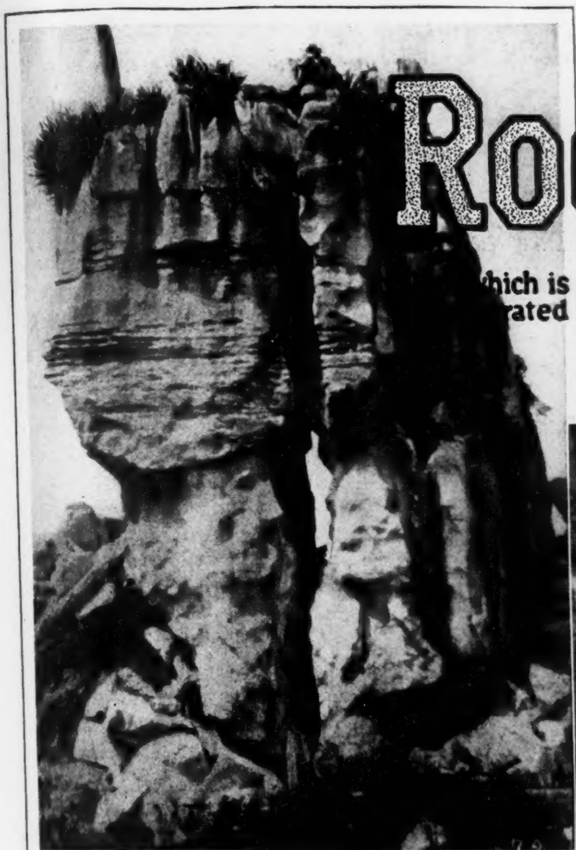

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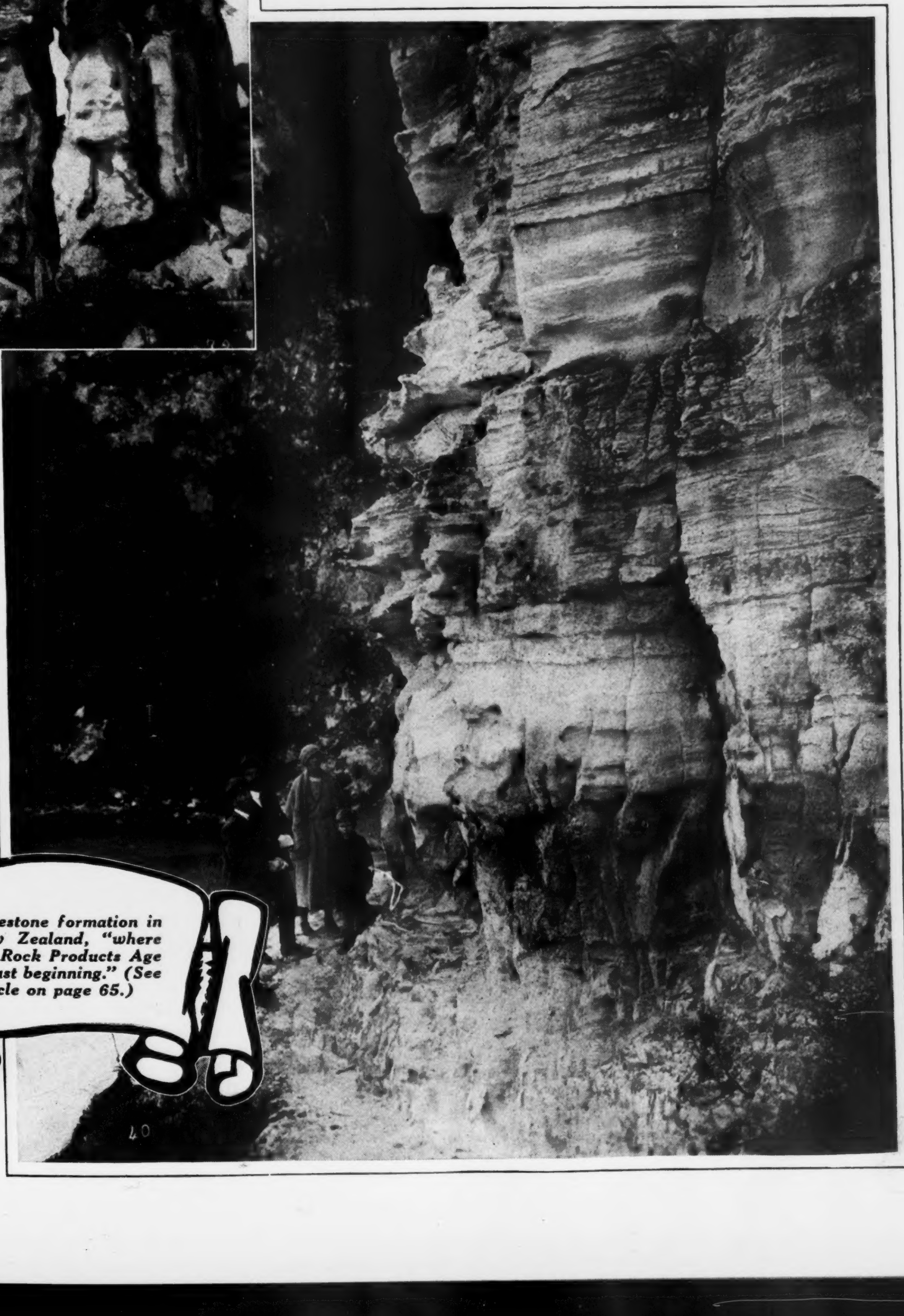


Limestone formation in New Zealand, "where the Rock Products Age is just beginning." (See article on page 65.)

Geological Work of France Stone Company

Ohio Crushed Stone Producer Finds it Profitable to Employ a Mining Geologist and to Maintain a Physical and Chemical Testing Laboratory

THE FRANCE STONE CO., Toledo, Ohio, is probably the world's largest producer of commercial crushed stone (excluding fluxing stone). It owns 20-odd quarries and at the time this is written it is operating 16 of them. And the production indicates that each quarry of itself would pass for a fair-sized operation, for the average production is around 2000 tons per day per plant.

Something over a year ago the company added a geologist and mining engineer, Arthur C. Avril, to its staff. This is said to be the first time that a geologist has been permanently employed by a crushed-stone producer, although other companies have employed them to do prospecting work and to solve special problems. And, of course, the state geological bureaus are constantly being called upon to give information to quarry operators.

A great deal more geological work has been done in connection with crushed-stone production than even one well acquainted with the industry might think. And many producers have studied geology seriously and know how to apply it in a practical way. Such men as John Sloan, John Rice and James Savage, to name only a few of those prominent in the National Crushed Stone Association, have more than an amateur's knowledge of the subject.

The France Stone Co., therefore, has taken only a logical step in advance in employing a professional geologist. It has merely arranged to get regularly and continuously the information that other companies have obtained when and if it was needed. The advantages of doing this naturally apply more to a company with large production and a number of operations than to a company operating a single quarry in a well developed region. Nevertheless, it is probable that before very long other companies will find it wise and profitable to follow the example and either employ a geologist regularly or else arrange to call on one frequently.

Arthur C. Avril, geologist and mining engineer of the France Stone Co.

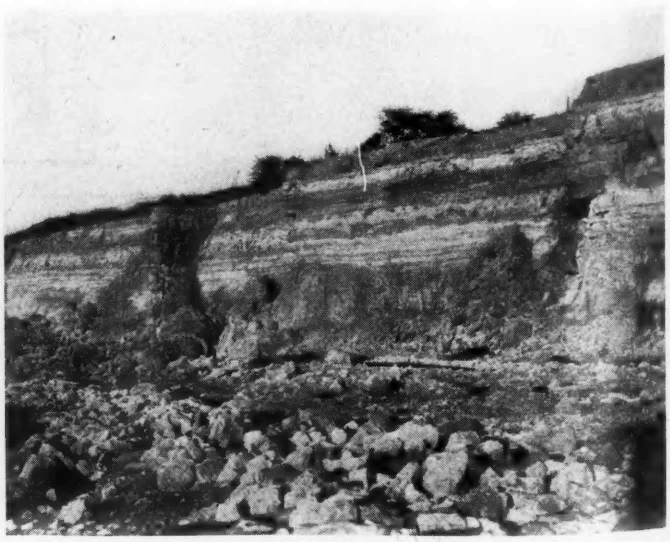
Recently a ROCK PRODUCTS editor visited Toledo, talked with Mr. Avril and went to some of the France company's quarries to see how the work was applied. Access was given to maps, records and reports so that the stone industry might learn that the work of the geological department had definite and practical results, the sort that are shown in lower costs and increased sales. It will be described in some detail in order that the reader may see that this is true.

A rough division of the geologist's work would be something as follows:

1. Mapping the quarry resources, developed and undeveloped, of the company and comparing them with production.
2. Assisting the operating department by giving warning of anything unusual that might come in the future, such as the possibility of striking water and important changes in the formation.
3. Planning for increased or new production.
4. Assisting the sales department by assurance of the available quantity and grade of rock needed for large or unusual contracts.
5. Finding possible new uses for the product and possible uses for rock left behind in the quarry.
6. Making general surveys which might show possibilities outside of the present work, and the relation of the company's quarries to competitive sources of crushed rock.
7. Interpreting results of chemical and physical testing.

To do all this looks like a large order

Lower part of the Rasin river dolomite. The rock breaks very blocky—the man in the circle gives an idea of the size



Stratification of Rasin river dolomite. Note the solid stratum in the lower part of the face which is about 50 ft. high

and more like the work of many men than of one. So it would be if it were all to be done at once. But some of it is only worked on as the time permits and a part of it is done only as the necessity arises. As examples, the mapping of the resources has only been begun and it will not be completed for a long time, as it is carried on as other work permits. But information needed by the operating and sales departments is wanted quickly, and other work has to be laid aside when it is called for.

ROCK SYSTEM	FORMATION
PERMIAN	**Dunkard** (Shales, Sandstone and Coal)
PENNSYLVANIAN	**Monongahela** (Coal, Shales and Sandstone)
	Conemaugh (Shales, Sandstone, Coal and Limestone)
	Pottsville and Alleghany (Coal, Sandstone, Shales and Limestone)
MISS.	**Waverly and Maxwell** (Shales, Sandstone and Limestone)
DEVONIAN	**Olentangey and Ohio** (Shales)
	Columbus and Delaware (Limestone and Shale)
	Monroe (Limestone)
SILURIAN	**Niagara** (Limestone and Shale) Contains some Monroe in Adams county
	Brassfield (Limestone)
ORDOVICIAN	**Richmond** (Shale and Limestone)
	Maysville (Shale and Limestone)
	Eden (Shale and Limestone)
	Trenton (Shale and Limestone)

Stratigraphy of Ohio following map of 1920, by J. A. Bownocker, state geologist

How the Geologist Gets His Facts

The geologist has to work from facts and he gets his facts in different ways. The principal way is by core drilling the deposit. Core drilling is being carried on constantly on some one of the company's properties, and the cores are continually being analyzed and tested. A chemical and physical testing laboratory is maintained for this and other work. The other ways in which the information is obtained are: By a study of the quarry face, a study of the surface and finally by a study of geological maps and reports, both to check up what is observed, by what others have found, and to get new leads for further investigation. Mr. Avril's job is not of the swivel-chair kind. The biggest part of his time is spent in the field either where core drilling is going on or in the quarries, noting new developments at the face.

Before taking the writer to the quarries Mr. Avril gave him a few hours with the geological map of Ohio in order to get a general idea of the relation of the deposits to the great rock systems which are universally known. On this page will be found simple stratigraphic charts of Ohio and the Monroe formation. It may be noted that most of the company's quarries are in what is known as the Monroe formation, which the Ohio geological survey places as between the Silurian and Devonian rock systems, while the Michigan survey places it as the upper formation of the Silurian. The Monroe formation is cut in the center by the Sylvanian sandstone, which has been worked for silica sand in some places. Above it are: The Flat Rock dolomite, 50 ft. thick; the Anderdon limestone, 50 ft. thick; the Amherstberg dolomite, 20 ft. thick; and, at the top, the Lucas dolomite, 200 ft. thick. In the Lucas limestone the company has only one quarry, that at Silica, Ohio. The limestones between this and the Sylvanian sandstone are not worked. All these make up the Upper Monroe formation.

Going down from the Sylvania sandstone into what is called the Lower Monroe formations there are: The Rasin River dolomite, 200 ft. thick; the Put-in-Bay dolomite, 100 ft. thick; the Tymochtee limestone and shale, 90 ft. thick; and the Greenfield dolomite, 100 ft. thick. Most of this company's quarries are in the Lower Monroe formations. Among these are the quarries at Monroe, Mich., and at North Baltimore, Dunkirk, Kenton, Middlepoint and Waterville, Ohio. Monroe and Holland quarries are in the Rasin River dolomite, Middlepoint is probably wholly in the Put-in-Bay dolomite and the remainder are partly in the Put-in-Bay and partly in the Tymochtee.

Just above these on the stratigraphic chart the reader will note the Columbus and Delaware limestone formation in the Lower Devonian. This formation holds a number of important Ohio quarries such as that of the Marble Cliff Quarries Co., at Columbus, and the National Lime and Stone Co.'s quarry at White Sulphur. It is also the source of much cement plant raw material. The France Stone Co. has two quarries in this formation, at Bloomville and Bellevue, both in Ohio.

UPPER MONROE	**Lucas Dolomite** 200 ft. (Quarry at Silica, Ohio)
	Amherstberg Dolomite, 20 ft. **Anderdon Lime, 70 ft.**
	Flat Rock Dolomite 100 ft.
	Sylvania Sandstone 200 to 300 ft.
LOWER MONROE	**Rasin River Dolomite** 200 ft. (Quarries at Holland, Ohio, and Monroe, Mich.
	Put-in-Bay Dolomite 100 ft.
	Tymochtee Shale 90 ft.
	Greenfield Dolomite 100 ft.

The Monroe formation in Ohio and Michigan

In passing it may be noted that under the Monroe formation is the Niagara limestone from which comes the rock that is burned to produce the famous Ohio finishing hydrate at Woodville.

In Indiana the France company operates quarries at Huntington and Bluffton. These are in what is known in Indiana as the Guelph formation, which corresponds in position to the Monroe in Ohio and Michigan and is probably made up of the same rocks. At Greencastle, Ind., the company has another quarry working in the Mitchell limestone, which is in the middle of the Mississippian rock system. It is about 100 ft. thick and is an important source of limestone in Indiana. It is a high calcium stone containing no magnesia and very little silica and iron.

The geological map of Ohio shows that all the rocks mentioned are to be found in the western half of the state, and that they are west of a band which runs south from Cleveland to the Ohio river. This band contains no limestone but it does contain valuable deposits of silica sand and conglomerate and clay. East, the rocks largely belong to the Pennsylvanian system, important for its coal beds, clays and silica sand, but not so important for limestones. In the states west of the Mississippi river, where

Face of Bellevue quarry showing good fragmentation from air-drill blasting The rock here is Columbus and Delaware limestone

Face of Lucas dolomite in quarry at Silica, Ohio. The rock appears to have been shattered and cemented together by solutions of lime

stone is scarce, the Pennsylvania limestones are an important source of concrete aggregate and cement rock. But in Ohio the best deposits are found in the older rocks, as is the case in most of the Eastern states.

The reason why the older rocks are exposed in the western half of the state and not in the eastern half is very clear if one looks at the geological section of Ohio which is shown on page 42. The deposits lie at a flat angle with the surface, bending so as to be almost parallel with the surface in the western part. The section shows that the later formations (above the Devonian) have been eroded and carried away by streams and rivers which no longer exist. Geologically speaking, this part of the country has *matured*. The surface has been worn down to a plain and the agencies that did this are not very active today.

This part of the state contains the Cincinnati anticline which runs from Cincinnati to a point east of Toledo. The Monroe formation is exposed on both sides of this anticline although it shows only on the east side in the geological section on page 42.

Core Drilling

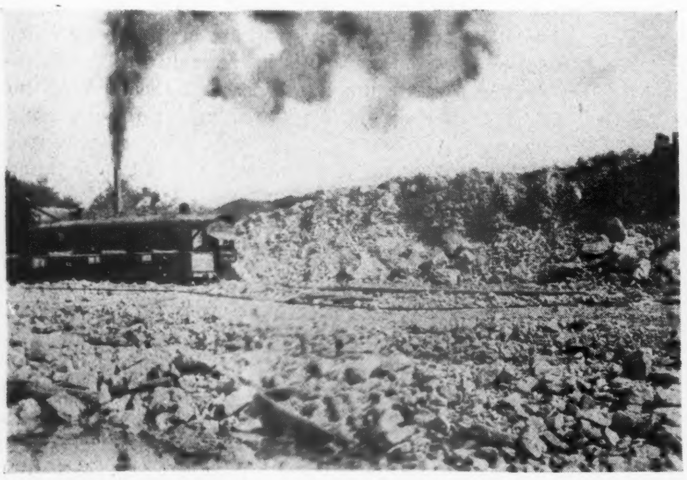
The core drill used was made by E. J. Longyear, Marquette, Mich., and is of a standard type used in prospecting iron ore, coal, limestone and other deposits. It is a diamond drill, of course, and the France company's experience is that it pays to use the best grade of diamonds in drilling limestone. These are bought from R. S. Patrick, of Duluth, Minn. No diamonds have been lost. Two that were chipped were utilized in making a laboratory core drill, so the only loss in diamonds has been from actual wear of drilling which is small.

At the start 1¼-in. cores were taken, but by the time this is published the drill will have been changed to take 2¼-in. cores. The reason for this is that it is intended to apply all the physical and chemical tests to the cores and the standard wear test has to be made on 2-in. pieces.

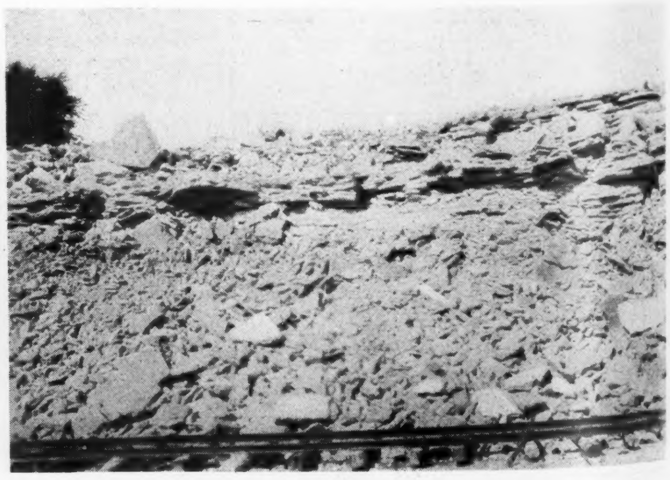
As fast as a core is taken it is marked and placed in a core box. Each box holds seven pieces, each 3 ft. long, so that it represents 21 ft. of drilling. The pieces of core are laid in order and one may see what 21 ft. of the section is like by looking at the cores in the box. Four or five boxes are crated together to send to the laboratory.

Core recovery averages about 90%, which is considered very good. A very complete log is kept for each hole and a daily record is sent in showing the number of feet drilled, reasons for any lost time (such as setting bits), repairs made and supplies purchased, the number of times the drill was pulled up, the core recovery and a summary of the day's work in which any additional needed information is given. The number of feet drilled of course varies greatly according to the character of the rock.

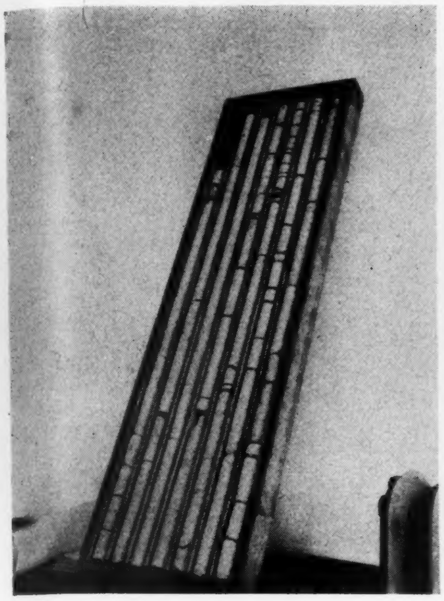
One hole drilled under average conditions, was 89 ft., 10 in. deep of which 11 ft. 2 in. was through the dirt and loose rock in the upper part of the deposit. About 5 ft. of core was lost in small pieces, so that the recovery was considerably better than 90% in this instance.



Shovel and "mine" cars at the Bloomville quarry. This is the oldest of the France quarries



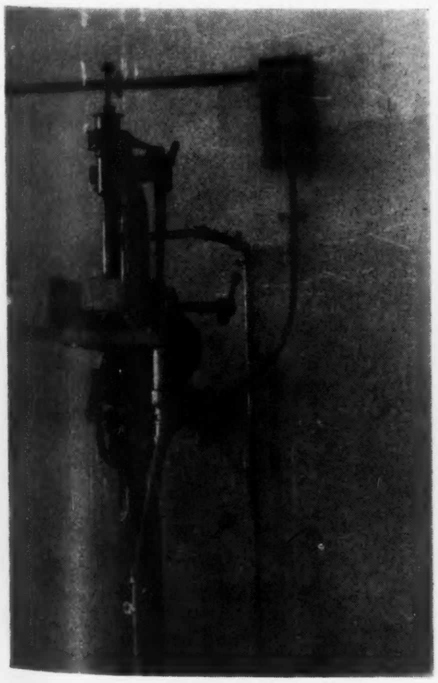
Columbus and Delaware limestone in the face of the Bloomville quarry



Core box which contains 21 ft. of drill cores laid in order

In starting to drill on a deposit in which a quarry is working care is taken to begin far enough away from the face so that the rock will not show the effect of blasting. The ground is laid off in squares, usually 300 ft. each way. When enough holes have been put down to give the information, a drawing is made which shows a section through the deposit along a line of holes. With several of these sections and a map, there is not much lacking that a quarryman would want to know before beginning to work a deposit. The element of uncertainty is pretty well removed from quarrying by having the ground so thoroughly prospected.

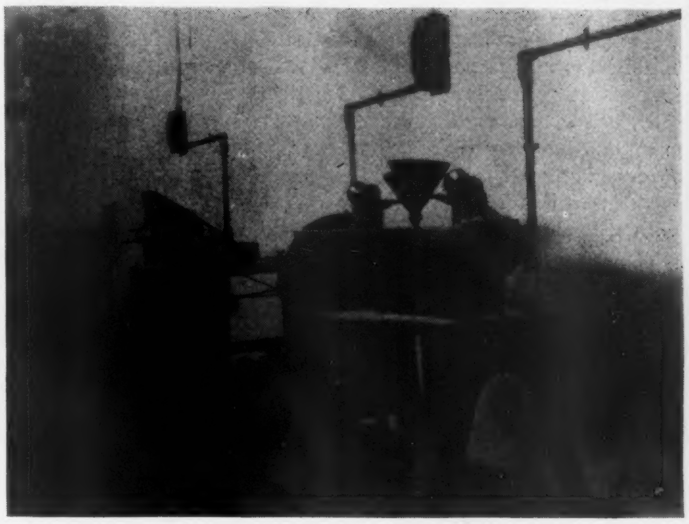
When the notes for this were being made the drill was working at the Greencastle, Ind., quarry, too far away to be readily visited.



Laboratory diamond drill for taking cores from samples

Testing the Cores

The laboratory of the France Stone Co. is about as well equipped for testing stone as any highway department laboratory the writer has seen, except for testing stone as concrete aggregate. A machine for breaking concrete beams is shortly to be installed and possibly later an Olson machine for testing cylinders in compression. The laboratory was opened in August of this year and had been running only a little more than a month when it was visited.



Machine for testing hardness installed in laboratory

The first room in the laboratory, about 25 ft. square, is the office and contains the usual desk and filing cases. There is also a drawing board where maps and sections are laid out from the data. The next room, arranged for physical testing, is perhaps 50 ft. long and 25 ft. wide. Through the center runs a long table on which samples are handled in making the different tests. On the left-hand side is a Braun "Chipmunk" jaw crusher and a Braun disk grinder each with its individual motor. These are used to grind samples for chemical analysis. There is also a Tyler "Ro-tap" machine for making screen tests. Beyond this is the drying cabinet of galvanized iron and a laboratory diamond drill for taking cores from samples for the hardness test and other tests.

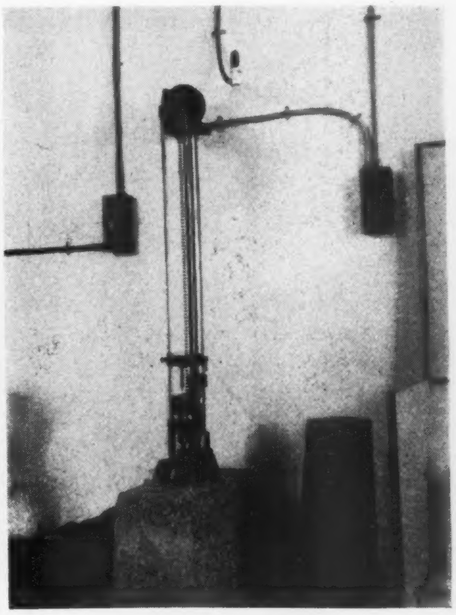
On the right-hand side of the room is a Deval machine for determining the percentage of wear and the French coefficient. Next to this is a Riehle Bros. machine for determining toughness by the dropping of a steel weight on the specimen. Beyond this is the Olson machine for testing hardness. This test is made by grinding a cylinder cut from the stone on a revolving disk with sand under the application of a known pressure. At the end of the room on this side the concrete testing machine will be installed. A diamond saw and a grinding wheel are installed here for preparing sections for testing and examination.

Back of the physical testing room is the chemical laboratory. This is well equipped with the usual work tables and sinks. There is an efficient hood over an electric hot plate and a muffle furnace will be installed later. The analytical balance is a Becker chain automatic sensitive to 1/20 mg. and with a vernier device for reading weights to 1/20 mg.

A Practical Test

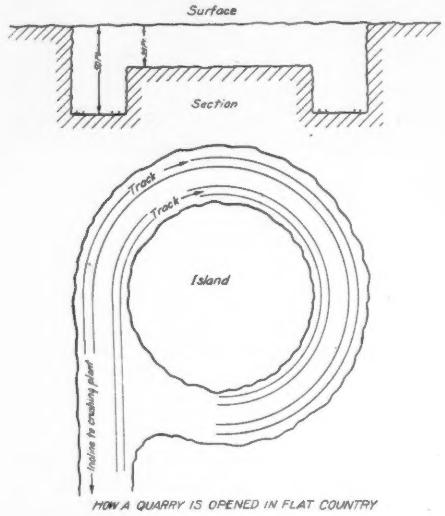
The laboratory by no means confines its work to testing cores and other samples the geologist may bring in. It is often asked to furnish information on the product of one of the quarries that is badly wanted by the sales department. A test to determine such information had just been put through when the laboratory was visited. A certain contract which was pending called for stone containing less than 1% of dust, and it is a difficult matter to make such rock, even from clean stone, especially in wet weather. It was decided to put in a simple washing chute with a screen bottom over which the stone would flow on its way to the railroad car while jets of water above washed the stone as it passed down the chute. The question was, did this simple contrivance wash the stone sufficiently to enable it to pass the specifications, or would a more elaborate washing plant be needed? The laboratory tested several samples of the washed stone and found the dust content was 0.6% which made it certain of acceptance.

The results of the chemical analyses and



Device for testing toughness of stone

physical tests made on the core drill cores are first made into a report and then put on the maps and sections. All these become part of the permanent records of the company, and of course they are consulted almost daily by someone either from the operating or sales department. An example of the worth of such information came up when the sales department was working on a very large contract for stone of a certain grade. It was desired to ship this from a particular quarry because of the transportation facilities, and the geological department was called on to know if this quarry could be depended upon to furnish so much stone of that particular grade. The answer came back that it could, and this was backed up by the figures from samples taken at the face and from drill cores.



Method used by the France Stone Co. to open quarries in flat country

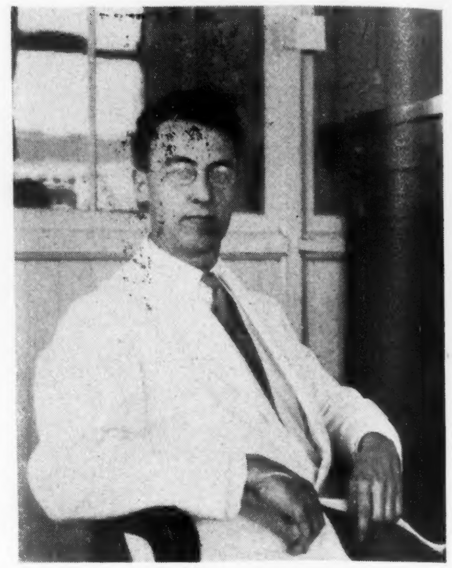
Before the laboratory was established the testing and analytical work was done in commercial laboratories. But this did not prove so satisfactory for a good many reasons, a principal one being that when information is wanted it is wanted quickly. With the volume of work that now has to be handled it is also cheaper to maintain a laboratory than to have the work done outside. The laboratory will take some custom analytical work from other companies.

The laboratory is in charge of Herbert F. Kriege, who was formerly in the laboratory of the Missouri state highway department. Mr. Kriege is a Ph.D. of Ohio State university and much of his work has been on silicate chemistry which he believes is to be of great importance in the future. In pursuit of this work he took post-graduate courses in soil chemistry and in the school of ceramics.

Field Work

The field work, to which Mr. Avril devotes most of his time may be either general or applied to a particular case. As an example of the general work, Mr. Avril made reports during the summer on the available limestone deposits which might produce crushed stone in the future. He found them plentiful in Ohio but rather limited in lower Michigan. Of course there is plenty of limestone in both these states but it is not enough to justify a quarry that limestone is present. Such matters as the depth of overburden, water, available transportation and, above all, the market for the product are quite as important as the quantity and quality of the limestone. Detailed information showing just the conditions at every available deposit is naturally invaluable to a large company.

Estimating and measuring the ground that may profitably produce crushed stone goes on all the time. All companies have such estimates, but with the information obtained from core drilling such an estimate becomes a real inventory of the company resources. It will be some time before such an inventory can be completed. Meanwhile the production is measured up and calculated in order to show the relation of resources to production.

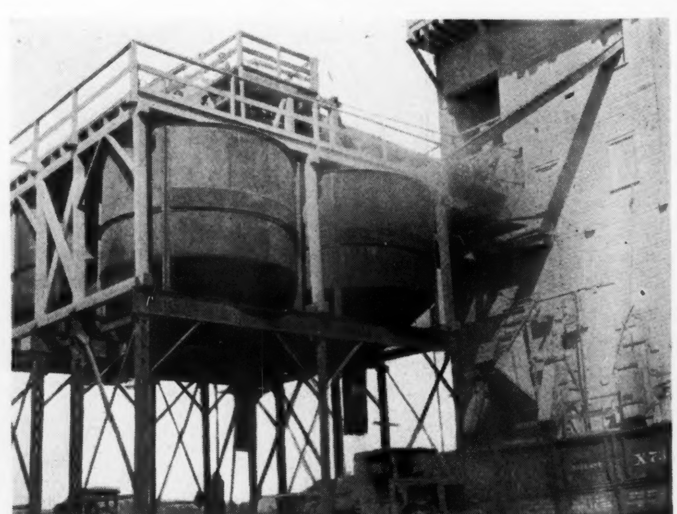


Herbert F. Kriege, in charge of France Stone Co.'s laboratory

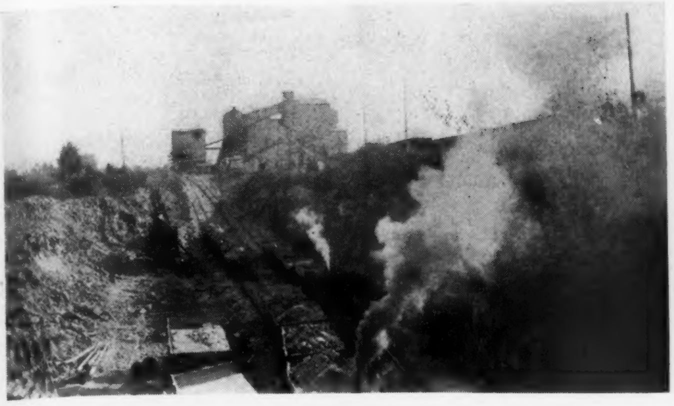
A big company like the France Stone Co. must look ahead a long way if it is to keep on. When quarrying was a one-man enterprise it was sufficient to know that, say, 25 years of production was assured. Before that was finished the quarry owner would probably have found other deposits that he could open, if he cared to keep on in the business. But a large company with many interests to protect must remember that its quarries are "dying assets," and new deposits must be found and opened before the old are too far exhausted. By doing this the company may continue indefinitely.

The quarries visited lie around the western end of Lake Erie where the country appears to be a flat plain. In some places it appears amazingly flat so that one can look along a highway for miles and hardly note a change of elevation. Actually, however, there is a fall of about 10 ft. to the mile toward the lake and this provides the grade to run off the surface water.

Holland, Ohio, plant—this is one of the older operations but is kept quite up-to-date



Steel bins of the tank type at the Holland plant. These are used for the large truck trade



Plant and incline at the Silica, Ohio, quarry—the largest operation in output

Monroe, Mich., quarry which is situated in Rasin river dolomite

Quarry Opening Methods

The usual method of opening a quarry in many parts of the United States is to go into a bluff or a hillside. But in this flat country different methods have to be employed. A hole is dug and enlarged so that a circular quarry face results. The tracks originally were carried around the face in a circle the empty cars coming in to the shovel behind the loaded cars that were pulled out. But this system has been replaced by a system of radial tracks in some quarries. The circular track was tied up all the way around by such an accident as a car derailment, so that if two shovels were working both would be out of commission. With the radial tracks only one shovel would be put out of business by such an accident.

When the circle had been widened out to such a diameter that a change would pay the quarry was deepened. The first cut varied in depth at different quarries from 18 to 30 ft.—whatever seemed the best working face for the particular conditions. The second cut was of the same depth all around the face like a wide trench. This left an "island" in the center. When this island had been worked out another island could be made in the same way or the high face, perhaps 50 ft. high, could be worked. It was noted in the quarries visited that both methods of working were used.

In one quarry visited air drilling was used and in the others the ordinary well drilling to put down 6-in. holes. The company employs a blasting engineer, F. F. McLaughlin, who is pretty well known in the rock products industries because of the papers he has given at the National Safety Council meetings on the handling of explosives. He is almost constantly in the field studying the rock and determining the most efficient methods of drilling and blasting. It was as an efficiency man in connection with explosives that he first came to the France Stone Co.

Naturally the blasting procedure varies at every quarry and even in different parts of the same quarry so no description of the blasting methods can be given.

In all the quarries visited Marion No. 91 steam shovels are used, with 3½-yd. dippers. The rock is drilled with Loomis well drills. Cars are brought in by steam locomotives of variout makes and the cars used are of different makes and types. The most curious car noted was one with a high wooden box body such as is used in coal mining. This was employed at the Bloomville quarry.

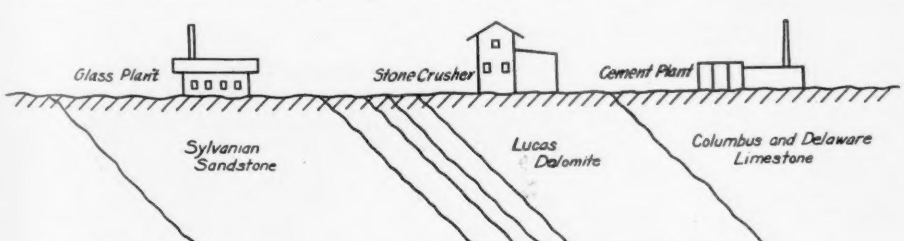
The first quarry visited was at Holland, Ohio, and it is situated in the upper part of the Rasin River dolomite (Lower Monroe formation). This upper part gives good fragmentation on blasting and a No. 8 gyratory primary crusher is large enough for most pieces encountered. Holland is one of the older operations of the company, but the plant is kept quite up to date, and the production is 2000 tons daily. A considerable business is done by truck delivery and a well built set of steel bins, of the tank type has been erected for this trade. The bins are set so that two or three trucks can—and often do—load at once and the bins are kept filled by belt conveyors running from the plant.

Formations at Silica, Ohio, Quarry

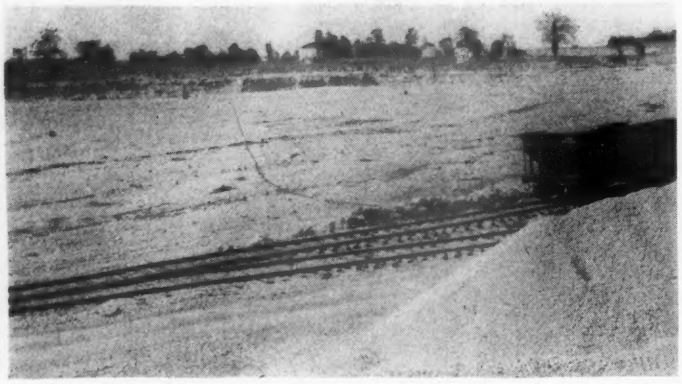
From Holland we drove to Silica where one of the largest plants (in point of production) of the company is situated. The present production is 4000 tons a day and occasionally this has been exceeded. This quarry is in the Lucas dolomite which is in the Upper Monroe formation. The present face appears to be about 60 ft. high.

The formations all pitch somewhat sharply here so that not only the Lucas dolomite but the Columbus and Delaware limestone above it and the Sylvanian sandstone below it are exposed. All three have been worked commercially. The Sandusky Portland

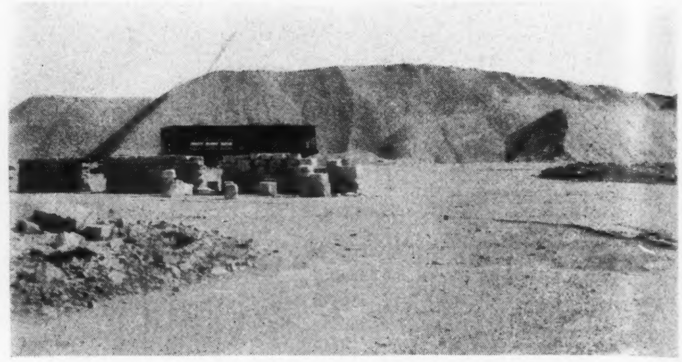
Looking across the Holland, Ohio, quarry situated in Rasin river dolomite



Three different industries get raw material from formations exposed at Silica, Ohio



Looking across the floor of the Bloomville, Ohio, quarry is like looking over a lake, it is so flat



Storage piles at the Bloomville quarry. Building stone (shown in the foreground) is also produced

Cement Co.'s plant gets its limestone from the Columbus and Delaware limestone and the Sylvanian glass plant formerly got its silica sand from the Sylvanian sandstone. The glass plant is shut down now as its product was largely beer bottles. The sand contains a little too much iron to make plate or window glass.

Mr. Avril drew a sketch of the formation at this point which is reproduced here.

The Lucas dolomite is quite different from the Rasin River dolomite seen at Holland. That breaks with the pronounced conchoidal fracture which is typical of most dolomites. The Lucas dolomite breaks in pieces which have flatter faces. But the most noticeable difference was seen on examining the quarry face. The Lucas dolomite, where it is exposed in the quarry at Silica, appears to have been shattered and then cemented into a solid mass by solutions containing lime. "The structure is almost brecciated," is the way Mr. Avril put it.

The cracks that were healed in this way by the solutions carrying limestone and magnesia were some of them of such size that quite large crystals were deposited. Several fair sized crystals of calcite were picked up from the fragments on the quarry floor. Mr. Avril said he thought some of the crystals were dolomite, a somewhat rare form, but he did not identify them positively then.

Rebuilding Monroe Plant

The quarry at Monroe, Mich., which was next visited, has been worked for a good many years and has been a heavy producer.

No. 21 crusher on its foundation at new Monroe plant

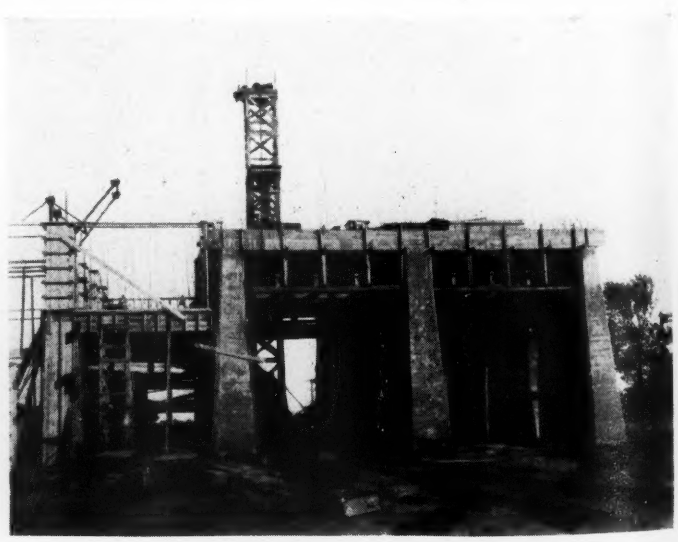
A crushing plant of 5000 tons daily capacity was burned last year and a new plant is being built. This is to have a capacity of 2500 tons at the start.

A No. 21 crusher has been already placed. This is a larger crusher than is in use at any of the other quarries which were visited but the reason for installing so large a crusher is apparent if one studies the quarry face.

The face where it is shown in the photograph is about 50 ft. high. The upper 30 ft. or so is beautifully stratified, the part below this is a solid layer, about 20 ft. thick where shown, that breaks into large blocks when it is blasted. Without a large crusher the expense of block-holing such large pieces would make the cost of stone production very expensive.

There are two No. 91 Marion shovels in this quarry. The circular track system has been changed to a number of tracks that come to switches at the foot of the incline to the plant. Standard gage track and heavy rail are used. All the quarry tracks at the France quarries visited appeared to be unusually well maintained, but this was particularly noticeable at the Monroe quarry. It seems to be the policy of the company to spend money on track maintenance rather than in lost time and repair charges due to

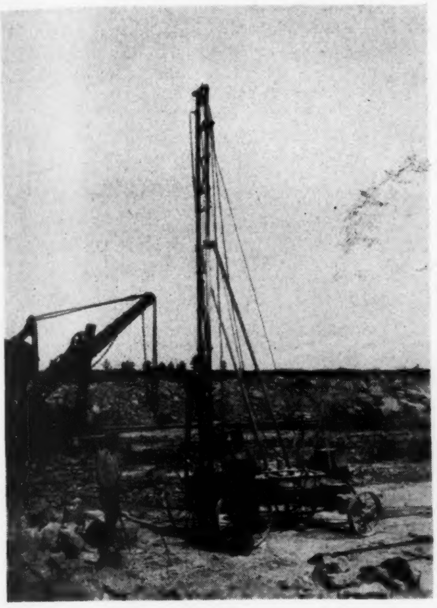
Plant at Bellevue, Ohio, one of the smaller operations



Foundations for bins at the new Monroe, Mich., plant

derailments and other accidents that come from poor tracks.

Two other quarries were visited both of which are in the Columbus and Delaware limestone which lies above the Monroe formation. One of these is at Bellevue and the other at Bloomville, Ohio. The Bellevue quarry is one of the smallest operations of the France Stone Co., producing 800 tons daily at the present time. It is an old quarry. A considerable area has been worked over and abandoned for a location nearer the plant and in a somewhat better grade of stone.



Air-drill with wagon mounting used with success at the Bellevue, Ohio, quarry

This operation was most interesting because it is the one in which well drilling has been superseded by air drilling. The air drill is an Ingersoll-Rand jackhammer with the wagon mounting. This was bought after some experimenting with an ordinary jackhammer mounted on a pipe so that it could be raised and lowered to accommodate the long steel needed for deep holes.

The holes are set 6 ft. apart each way and put down 19 ft. Only two pieces of steel are used for a hole, the first driling about half way. The steel is hollow and sharpened with a cross bit and water is fed through the hollow steel to keep chips away from the bit.

Drilling is very fast with this rig. The actual footage made the day before the plant was visited was 276 ft. in 10 hr. As regards cost Mr. McLaughlin told the writer that air drilling was a little more expensive than well drilling, the difference being in the power cost, that is the cost of making compressed air and carrying it to the drill as against the cost of applying power directly to a well drill.

The advantage of air drilling in this quarry is to get better fragmentation, so that the rock may be handled by the steam shovel and the No. 9 crusher at the plant without too much expense for block-holing. In that way air drilling has proved the cheaper method for this particular quarry. One of the pictures shows the face after a shot and the figure of the man gives a comparison for the size of the pieces of rock. Practically everything in sight may be handled by the steam shovel and the No. 9 crusher.

Bloomville Quarry Producing for 40 Years

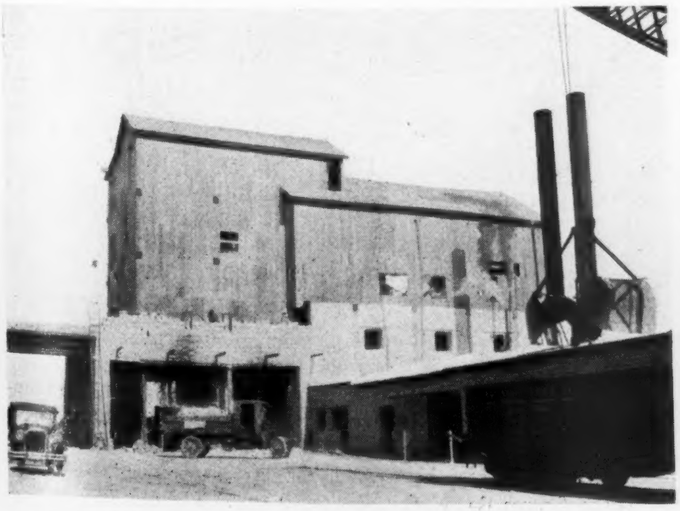
The last quarry visited, at Bloomville, is the oldest of the France quarries. It has produced for 40 years, both crushed stone and building stone and continues to produce both. The Columbus and Delaware limestone at this point is made up of narrow strata very even in thickness and extending over a large area.

One often hears of a quarry floor "as level as a dance floor," but here the statement is hardly an exaggeration. Mr. France regularly uses his car in looking over the quarry and he drove a party of us about, the car running as smoothly as it would on a concrete road.

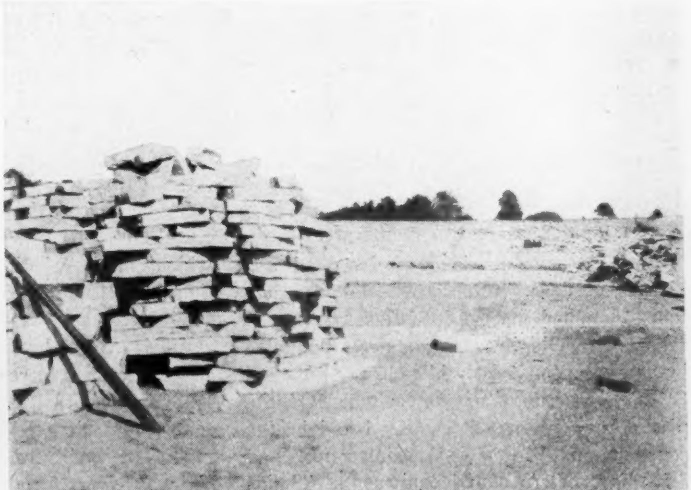
One often hears of a quarry operation running into a water channel so that pumps have to be installed but at this quarry the opposite occurred. For years a good-sized pumping plant had to be maintained to keep the quarry dry enough to work in. Then a water channel was struck, which actually drained the quarry completely and the pumping plant has never run from that day. Even the water from rains does not accumulate as it runs off as fast as it falls.

Rough stone from the quarry and old rails are used to build the Bloomville, Ohio, plant

The production of building stone is very simple. It was being ripped up in slabs from the quarry floor where the work was going on when the plant was visited. Three ledges, of 6-in., 8-in., and 12-in. thickness were worked, the pieces of each thickness being built in separate piles. Afterward these pieces were to be roughly squared into ash-



Crushing and power plant at Bloomville, Ohio, quarry being rebuilt of stone



Building stone from the 6 in. and 8 in. ledges at the Bloomville quarry

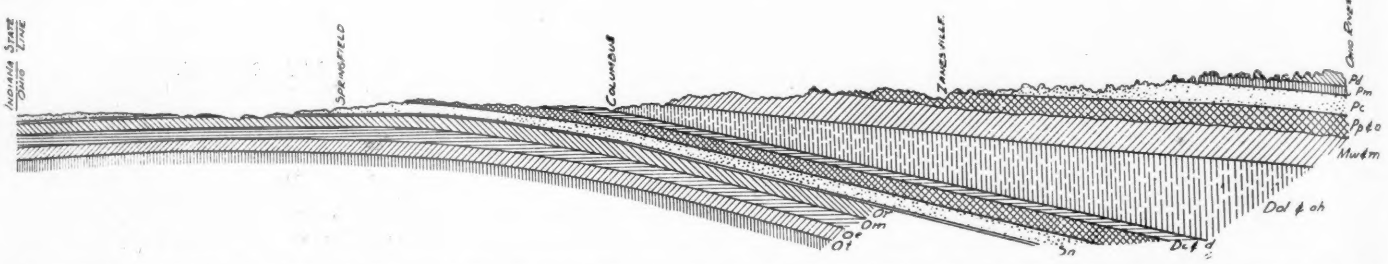
lars. Formerly much of this stone was cut to definite dimensions and made with a panel of rock cut face. But the demand for this kind of stone has gone with the changes of style in architecture.

The new France Hall and the Commons building at Heidelberg university, Tiffin, Ohio, are very handsome examples of building with this stone. But perhaps a more interesting example to the rock products industry is the new crushing plant that is being built at the Bloomville quarry. The old plant is of wood and the new plant is being built around it like an outer shell, and when it is completed the wooden plant will be torn down and removed. This removal has already been completed in the case of the power house. Old rails from the quarry tracks (about 60-lb.) have been used for rafters and above door and window openings.

The principal production of this quarry is in crushed stone and 1400 tons is the average daily production.

An interesting feature of this quarry is the type of car used. This is a type used in coal mines resembling a high-sided wooden box on wheels and provided with an end dump. It is well liked and seems especially adapted to the conditions at this quarry.

The France Stone Co. has its offices in the Second National Bank building, Toledo, Ohio. N. R. France is president and E. H. France and G. A. France are vice-presidents, the former in charge of operations and the latter in charge of sales. W. G. Scheub is secretary. Howard E. Bair is manager, H. M. Sharp is assistant manager and J. J. Harrigan is general superintendent.



Legend: Formations marked are: Pd, Dunkard; Pm, Monongahela; Po, Conemaugh; Pp & G, Pottsville and Alleghaney; Mw & M, Waverly and Maxwell; Dol & oh, Olentangey and Ohio; Dc & d, Columbus and Delaware; M, Monroe; Sn, Niagara; Sb, Brassfield; Or, Richmond; Om, Maysville; Oe, Eden; Ot, Trenton. (From State Geological Survey Mapa of 1920. See also stratigraphic chart on a preceding page.)

Geological section of Ohio on east-west line through Columbus

State Highway Expenditure Was $650,000,000 Last Year

THE total expenditure by the state highway departments in 1925 for road and bridge construction on state highway systems amounted to $649,125,101, according to reports from highway departments compiled by the Bureau of Public Roads, United States Department of Agriculture. Of the total 59.6% was spent for road and bridge construction, 18.4% for maintenance, and 3.5% for materials and equipment. Administrative and engineering costs accounted for 4.7%, interest and principal payments on bonds 7.8%, and miscellaneous expenditures amounted to 6.0% of the total expenditures.

To meet these expenses the departments received from various sources during the year $780,081,292, of which $115,656,721 was a balance from the previous year's operations, so that the amount of money raised during the year was only $664,424,571. Of this amount 43.5% was raised by means of motor vehicle license fees and gasoline taxes, 30% from the former and the balance from the latter. The sale of bonds realized 21.3% of the total for the year, and federal aid amounted to 13.9%. Funds transferred to the state by the counties and other local governments amounted to 10.8%, and the balance was made up of funds derived from special highway taxes and appropriations and from miscellaneous sources as follows: Taxes, 3.3%; appropriations, 5.0%; miscellaneous, 2.2%.

Although the year's expenditures were slightly greater than the previous year's total of $605,665,207, the balance of $130,956,191 carried over into the current year was even greater than the amount of unexpended funds carried over from 1924. The rate of construction remained about the same as in previous years.

One of the significant facts brought out by the report is the remarkable increase in the percentage of highway income derived from motor vehicle and gasoline taxes, and the falling off in the percentage representing real and personal property taxation. There has been a steady tendency in this direction since 1921. In that year the combined income from motor vehicle licenses and gasoline taxes amounted to 25.9%, the gas tax revenue amounting to less than 1%.

In the same period taxes on property specifically for road purposes have dropped from 11.2% to 3.3% of the year's total income. Including the income from appropriations and miscellaneous sources, most of which is raised indirectly by property taxation, the 1921 percentage was 20.7 and the 1925 percentage was 10.5.

Funds raised by the sale of bonds were also a smaller percentage of the total in 1925 than in 1921, being 21.3% in 1925 as compared with 27.8% in 1921.

The expenditures by the various state highway departments during the year are given in the table below. These figures do not include expenditures by county and local authorities for local roads.

Highway Expenditures in 1925

Alabama	$10,917,204
Arizona	2,442,947
Arkansas	11,200,000
California	18,090,728
Colorado	5,564,590
Connecticut	8,611,936
Delaware	3,492,841
Florida	8,483,752
Georgia	7,902,428
Idaho	3,636,681
Illinois	36,375,983
Indiana	14,517,794
Iowa	14,107,798
Kansas	7,407,369
Kentucky	14,916,316
Louisiana	8,610,624
Maine	7,105,389
Maryland	12,024,781
Massachusetts	12,880,700
Michigan	36,138,549
Minnesota	17,962,567
Mississippi	4,795,192
Missouri	31,593,937
Montana	1,267,242
Nebraska	5,563,752
Nevada	3,055,959
New Hampshire	4,027,241
New Jersey	23,939,454
New Mexico	3,322,548
New York	49,368,770
North Carolina	32,588,514
North Dakota	1,862,348
Ohio	24,086,289
Oklahoma	12,937,673
Oregon	15,553,453
Pennsylvania	62,294,366
Rhode Island	3,045,859
South Carolina	9,132,953
South Dakota	6,378,176
Tennessee	14,379,189
Texas	19,985,007
Utah	4,123,798
Vermont	3,618,327
Virginia	14,071,555
Washington	7,845,566
West Virginia	16,138,729
Wisconsin	7,784,733
Wyoming	3,973,494
Total	$649,125,101

Italian Asbestos Developments

THE Cave di San Vittore Co. of Italy is developing an asbestos mine in Sardinia and has plans under way for the production of asbestos products. Equipment for handling and manufacturing these products have been installed. About 2000 tons per day will be treated, the present production in Italy being about 600 tons. The company has recently increased its capital from 6,000,000 to 15,000,000 lire (about $200,000 to $500,000).

Classifying Fine Sand in a Long Box

Boonville Sand Co. Has Simple Method of Saving Fine Sand and Separating It into Sizes

THE Forestport plant of the Boonville Sand Co. of Utica, N. Y., works a sand deposit containing very little gravel. The greater part of the product is concrete sand used in state highway work and general construction. In order to produce sand of the proper grading for fine aggregate a considerable amount of fine sand has to be taken out. A market has been found for this to use as asphalt sand and as core and foundry sand. The fine sand taken out of the concrete sand serves without modification for asphalt sand so it has only to be collected and dewatered. But the core and foundry sands go to several different purchasers, each of whom has his own specification. This means that the grading of the sand must be controlled so that it may be changed to suit the wants of the buyer.

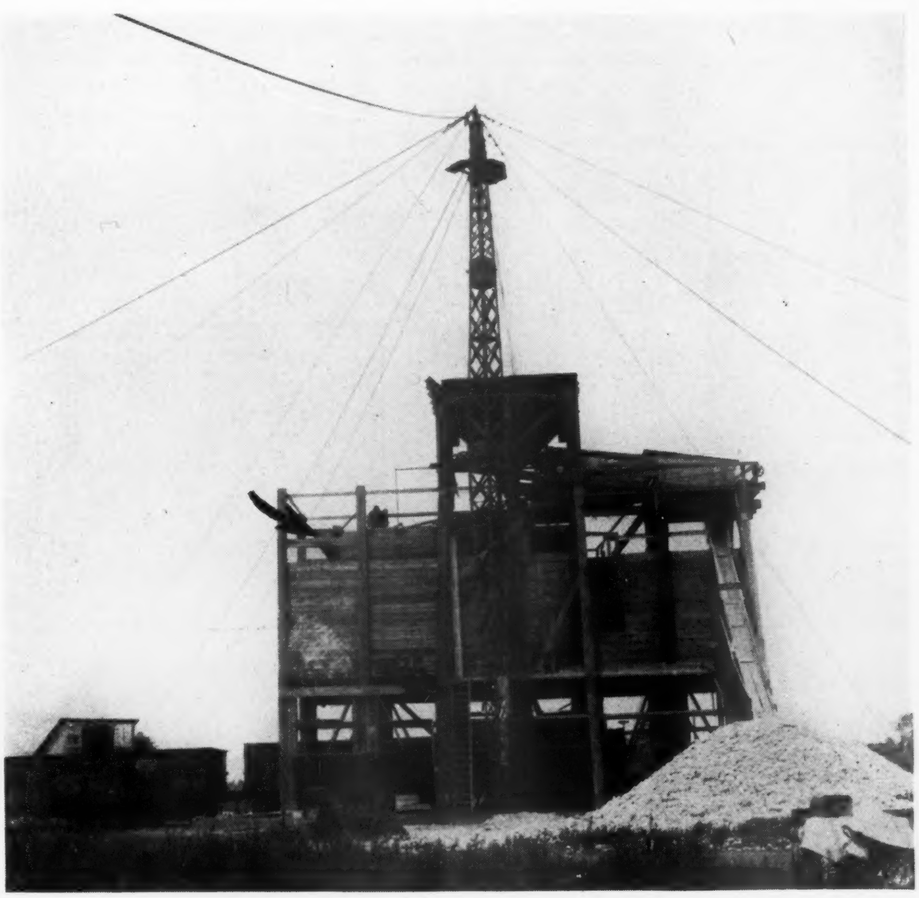
Screening was out of the question for such a fine grained material, for much of it will pass 100 mesh. The only alternative was to adopt some system of classification that would be simple, inexpensive (for the production of such sand is not large and the price is not high) and capable of being run by anyone without special training. For all of these reasons the device chosen was a plain settling box with means for varying the settling area and consequently the grading of the sand recovered.

A series of articles describing the use of such boxes as classifiers was published in Rock Products in 1922. From these J. H. Wagoner, the superintendent of the Boonville Sand Co., worked out the dimensions the box should have. For a flow of 600 g.p.m. of water it was calculated the box should be 8 ft. wide and 12 ft. long to save everything coarser than 100 mesh and some of the 100 mesh particles. The depth was made 8 ft. as this height was available.

A rough calculation shows that a 100 mesh particle would settle about 4 in. in passing from one end of the box to the other, which would be sufficient to insure the fall of the greater part of the grains of this size.

The box itself was simply constructed, care being taken to brace it well to stand the pressure of the settled sand, as sand which has settled under water has almost twice the bursting force that water has for the same depth. The discharge openings were ordinary molasses gates with the handles attached to small rods so that they could be worked from the outside of the tank.

As a settler for asphalt sand this box functioned perfectly and the product was shipped as recovered. It was found that the box required practically no attention except at the starting and stopping of the plant. When the plant was started it was necessary to run for a sufficient time to form a heap 4 or 5 ft. deep. This acted as an equalizer, the flow of fine sand being even enough so that the settled sand never ran out entirely or accumulated to such an extent that the sand rose above the level of the water. Of course the molasses gates had to be closed as soon as the plant shut down to prevent the sand from running out so that no dirty water might get into the bin.

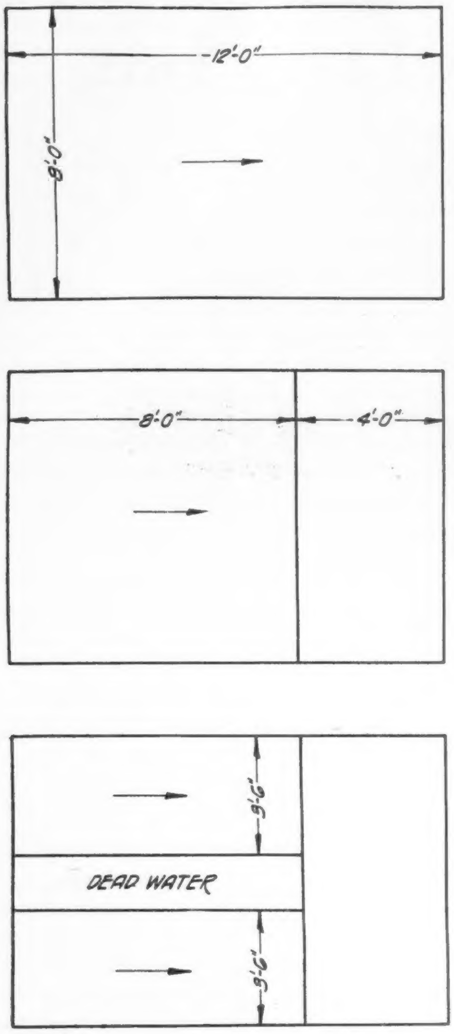


Forestport plant of Boonville Sand Co. The arrow points to the long box above the sand bin

The box settled a satisfactory asphalt sand, but when core sand was wanted it was necessary to make a coarser product. In making changes in a box of this kind one has always some guide in the grading of the sand which is settled along the box. It is coarsest at the end where the flow enters and finest at the overflow end. By taking samples it was judged that cutting down the length of the box to 8 ft. would give what was wanted and a partition was put in at 8 ft. from the entrance.

This depth gave a coarser grading, but there was still too much sand minus 80 mesh (about 28% in one sample). To reduce this a simple hydraulic water device was put in next to the partion. This was a horizontal pipe with a few ¼-in. holes on the under side. A tee in the center of this pipe joined a vertical pipe through which clear water entered. As soon as this was installed samples showed that the amount of fines settling had been reduced to about 50% of what the first sample showed or 14%.

Since the sand still contained too many fines the flow through the box was studied. It was found that there were several



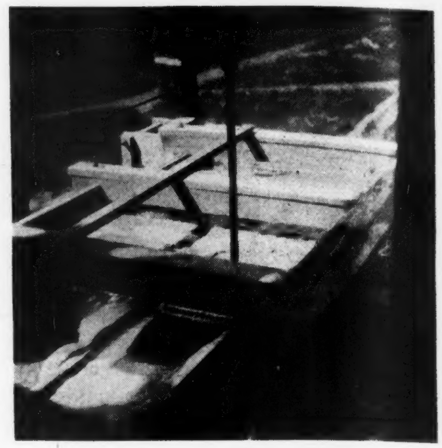
The three stages of recovery, showing how the partitions were placed

places where eddy currents formed and that the fine sand was dropped in these places. To do away with these eddy currents and to give a uniform flow through the tank, lengthwise partitions were introduced. These did not have to go below the surface more than a short distance to be effective, so 10-in. boards were used, braced between the box and the cross partition. These longitudinal partitions considerably improved the grading.

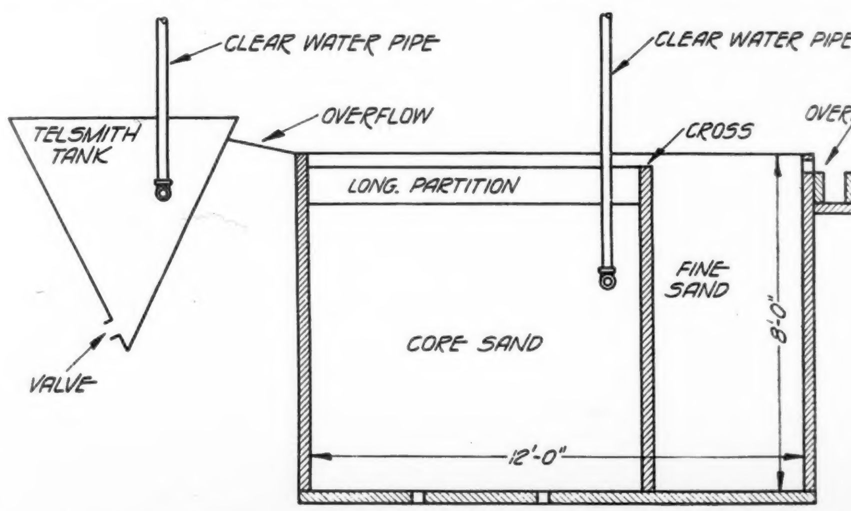
A market was found for the very fine sand saved on overflow side of the partition, so all the sand was made into salable products.

The whole plant, aside from the fine sand classifying and settling device, is interesting enough to justify a short description. The sand is dug with a $1\frac{1}{2}$-yd. Sauerman cableway dragline operated through a two-speed Meade-Morrison electric hoist. The cableway mast is of steel 80 ft. high and it supports a sheave with roller bearings. The original sheave had plain bearings and the change to roller bearings improved the work. Digging is through a 500-ft. radius.

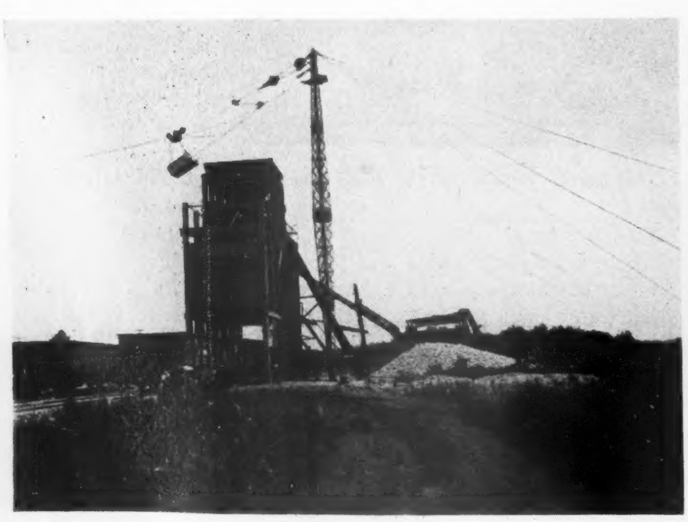
The bucket dumps into a hopper which has no grizzly above. From the hopper the material is fed by a Telsmith plate feeder to an Allis-Chalmers screen 48 in. by 20 ft., which is run by a 25-hp. Westinghouse motor through a 30 to 1 Jones speed reducer. The screen has a scrubber section of 3 ft., a section with $\frac{3}{8}$-in. by section of 6 ft., a section with $\frac{3}{8}$-in. by $3\frac{1}{4}$-in. slots and a section with $2\frac{1}{4}$-in. round holes. Everything passing the $\frac{3}{8}$-in. by $3\frac{1}{4}$-in. slots, which is the greater part of the product, goes to two No. 6 Telsmith automatic sand tanks. Everything passing the $2\frac{1}{4}$-in. round holes goes to the gravel bin. The oversize, of which



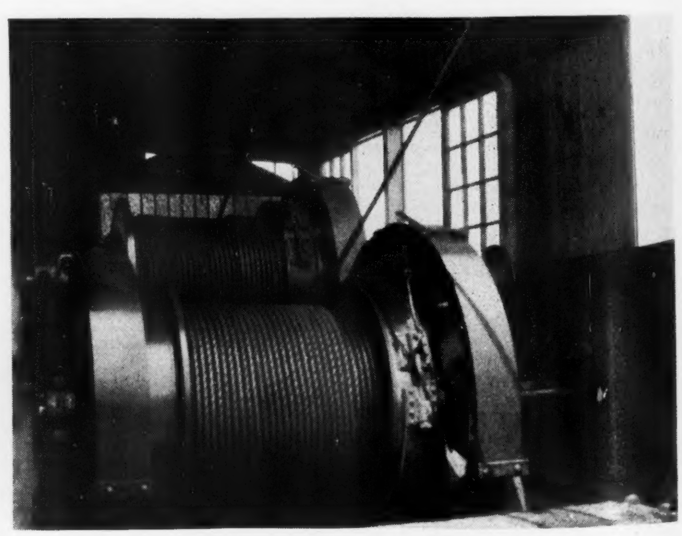
Looking down on the box



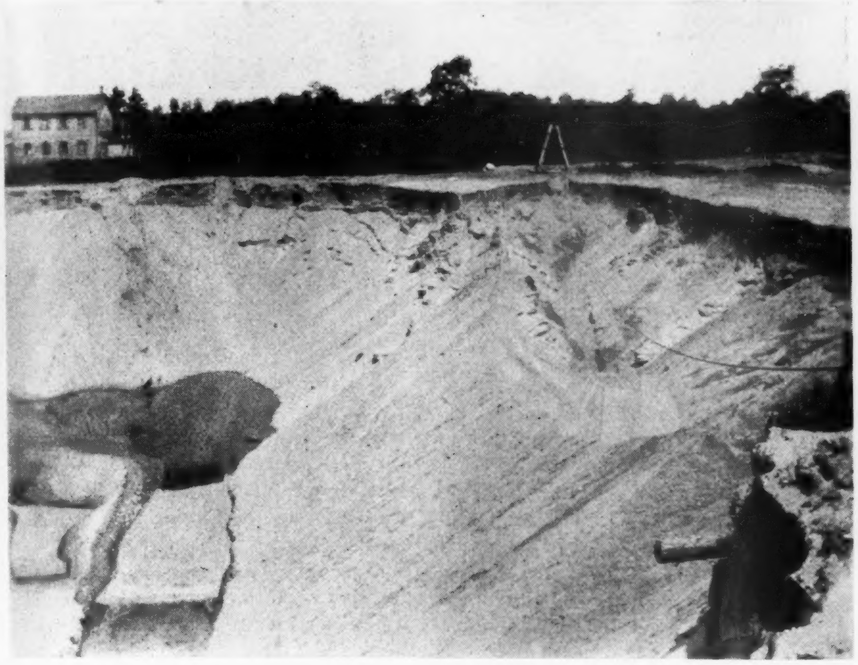
Section through sand tank and box with all partitions in place



End view of plant with bucket on the cableway dragline approaching hopper



The double-drum hoist by which the cableway bucket is handled

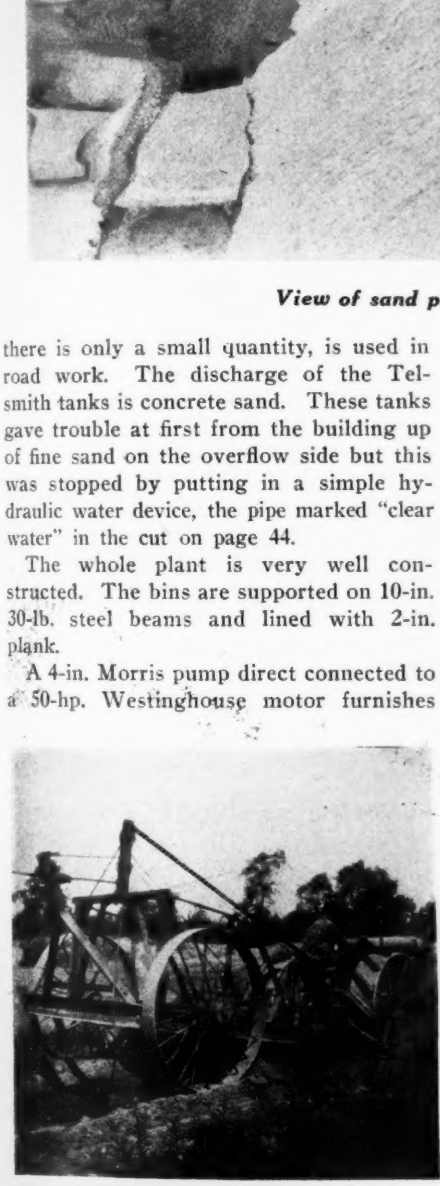


View of sand pit from the plant

there is only a small quantity, is used in road work. The discharge of the Telsmith tanks is concrete sand. These tanks gave trouble at first from the building up of fine sand on the overflow side but this was stopped by putting in a simple hydraulic water device, the pipe marked "clear water" in the cut on page 44.

The whole plant is very well constructed. The bins are supported on 10-in. 30-lb. steel beams and lined with 2-in. plank.

A 4-in. Morris pump direct connected to a 50-hp. Westinghouse motor furnishes



Scraper removing overburden

water for the plant, and to save friction losses the pipe line connecting pump and plant is of 6-in. pipe.

Fordson tractors do a lot of work around this little plant. One of them is used to shift cars and another to handle a Miami scraper by which the ground is stripped before it is worked by the dragline.

The office of the company is at 404 Court St., Utica, N. Y. Harold V. Owens is manager of the company.

New Method of Estimating Concrete Materials

STANTON WALKER, director of engineering and research of the National Sand and Gravel Association, has devised a method of estimating the quantities of material for concrete that is the simplest of the accurate methods that have come to the notice of ROCK PRODUCTS. Yet it has a thoroughly scientific basis, for it is based on the water-ratio which all authorities are now agreed is the single primary factor controlling the strength of cement in concrete.

The method is published in full in the *National Sand and Gravel Bulletin* for Sept. 15. It is rather long to publish here but the principles involved may be found in the abstract that follows:

Mr. Walker's equation from which he derives the quantities required is:

$$\left.\begin{array}{l}\text{Bbl. of cement per}\\ \text{cu. yd. of concrete}\end{array}\right\} = \frac{6.75}{0.5 + x + \dfrac{Wf}{62.5\,S_1} + \dfrac{Wc}{62.5\,S_2}}$$

x = the water-ratio: ratio of mixing water to cement by volume.

Wf = weight of fine aggregate in pounds used with 94 lb. (1 cu. ft.) of cement.

Wc = weight of coarse aggregate in pounds used with 94 lb. (1 cu. ft.) of cement.

S_1 and S_2 = apparent specific gravities of fine and coarse aggregates respectively.

6.75 = number of "barrels" in a cubic yard.

0.5 = an approximation for 0.48.

This last figure Mr. Walker calculates as the absolute volume (volume of solids) of the cement in 94 lb. or 1 cu. ft. of cement. If the cement has the usual specific gravity of 3.12 then it is evident that the absolute volume is:

$$\frac{94}{62.5 \times 3.12} = 0.48$$

Hence the cement paste volume would be the water ratio (x) plus 0.48, or, for convenience, x plus 0.50.

The first equation therefore may be stated as: the number of "barrels" in a yard divided by the volume of concrete produced by 94 lb. cement, which is equal to 0.5 plus the volume of mixing water in cu. ft. plus the result obtained by dividing the weight of the aggregate by 166.6.

As the specific gravities of the fine and coarse aggregates are usually the same and between 2.60 and 2.70, the expressions 62.5 S_1 and S_2 may be given the value as 166.6. Hence the first equation may take the form:

$$\left.\begin{array}{l}\text{Bbl. of cement per}\\ \text{cu. yd. of concrete}\end{array}\right\} = \frac{6.75}{0.5 + x\,\dfrac{(Wf + Wc)}{166.6}}$$

From this second equation a simple chart has been drawn from which the barrels of cement per cubic yard may be read off, provided the water ratio (or the gallons of water per sack of cement) and the pounds of aggregate for each 94 lb. of cement are known. Simple calculations based on the weight or volume of cement used gives the weight or volume of the aggregates required.

Assuming a 1:2:4 mix, sand weighing 85 lb. per cu. ft. and gravel 100 lb. per cu. ft. with 7 gal. water (.94 cu. ft.) for each cu. ft. of cement, then for each cu. ft. of cement there would be 170 lb. sand, 400 lb. gravel and .94 cu. ft. water.

Substituting in the second equation we have:

$$\left.\begin{array}{l}\text{Bbl. of cement per}\\ \text{cu. yd. of concrete}\end{array}\right\} = \frac{6.75}{0.5 + .94 + \dfrac{170 + 400}{166.6}} = 1.39$$

The sand required will then be $2 \times 1.39 \times 4 = \frac{11.1}{27} = 0.41$ cu. yd. and the gravel will be $4 \times 4 \times 1.39 = \frac{22.2}{27} = .82$ cu. yd. of gravel, twice what the sand would be.

If proportioning is by weight one has only to substitute the weights of the sand and gravel per cu. ft. in the place of Wf and Wc in the second equation to obtain the barrels of cement per cu. yd. wanted.

The method will give accurate results for workable concrete where there is no entrained air, as in very dry mixtures, and no water is lost, as in very wet mixtures.

A number of tables are given with the original articles showing the agreement of the method with the quantities given in the bulletins of the Structural Materials Research Laboratory, and as calculated by Pearson and Hitchcock's paper and by the method of Talbot and Retchie. The agreement is very close.

Alabama Producer Ships Sand and Gravel Long Distances by Water

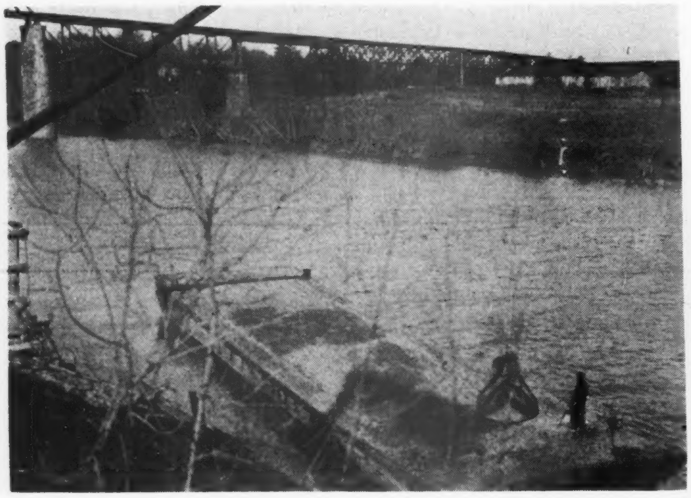
Baker Sand and Gravel Co., Operating Three Dredges, Is One of Alabama's Largest Producers

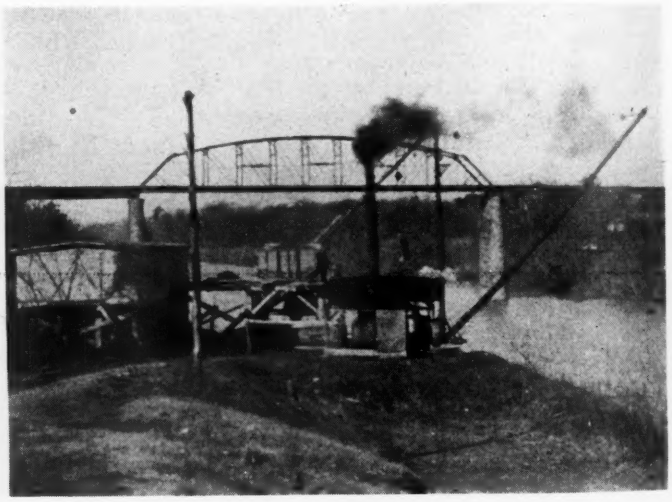
THE Baker Sand and Gravel Co. is one of the large producers operating in Alabama. The head of the company is Capt. J. E. Baker of Tuscaloosa, where the main office of the company is situated. Captain Baker has been concerned with the development of Alabama resources all his life. He is head of the Baker Coal Co. and the Baker Tow Boat Co., as well as of the sand and gravel company.

Operations are carried on over a long stretch of rivers. Three dredges are operated, one on the Tombigbee, one on the Alabama and one on the Warrior. All transportation is by water. A great deal of the sand and gravel produced is marketed in Mobile after it has been transported perhaps 100 miles. Shipments have been made to points on the Warrior 475 miles from Mobile and the system of waterways offered by connecting rivers is so extensive that a great many of the important towns in the state can be reached by water transportation.

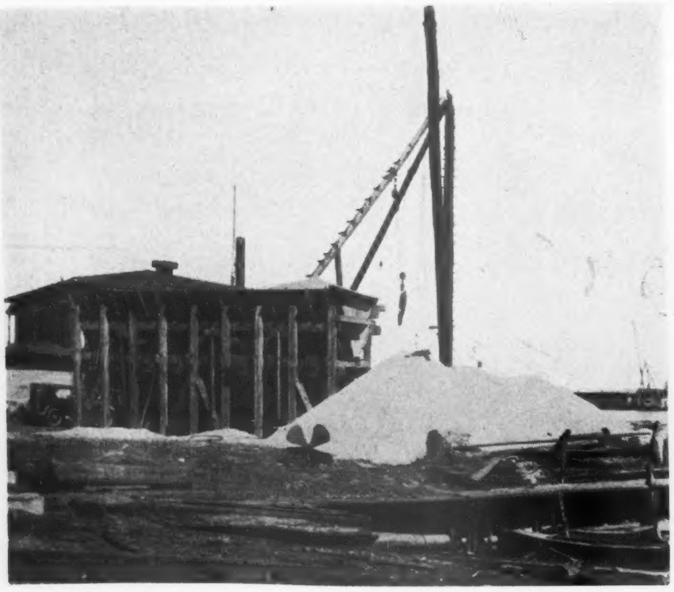
In the last year or two a considerable business of shipping gravel to Florida has been developed. The gravel dredged in the upper rivers is barged down to Mobile and then loaded by derrick boats to steamers, some of which are as large as 5000 tons net tonnage. Tampa and St. Petersburg on the west coast of Florida absorb these shipments.

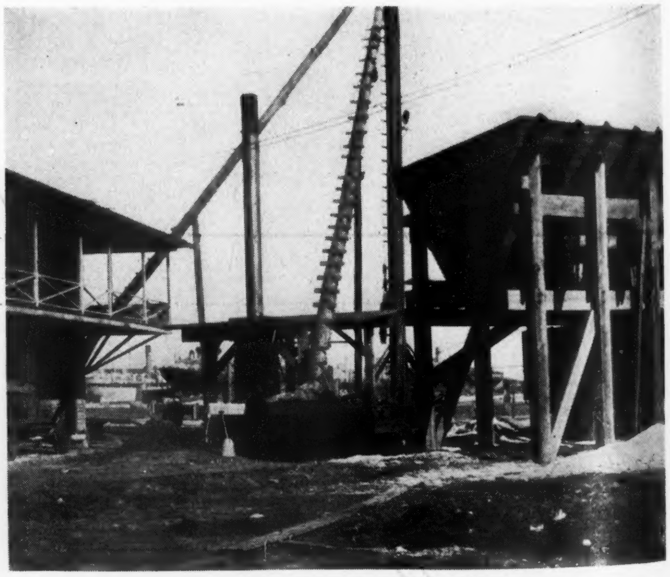
Since this business is so largely one of transportation it requires a large fleet of various kinds of craft for its operation. There are three full sized river steamers



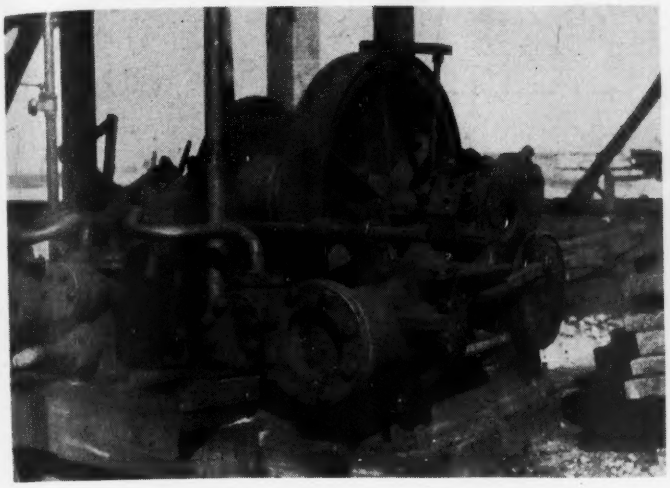


Left—Unloading barges at the Tuscaloosa landing on the Warrior river. Right—Unloading plant at Tuscaloosa on the Warrior river





Storage yard and bins of the Baker Sand and Gravel Co. at Mobile, Ala. The stored material is loaded from this yard on steamers for cities on the west coast of Florida



Hoist used to operate boom derrick at the Mobile yard

One of the fleet of 12 trucks at the Tuscaloosa plant

in this fleet, the *Baldwin*, the *Nugent* and the *Darling*. Then there are two gasoline boats, the *James R.* and the *Midget*. All of these are propelled by stern wheels. There are two derrick boats and about 50 barges. Both hopper-type and flush-deck barges are in use.

Unloading plants and yards are maintained at Tuscaloosa, Demopolis, Mobile and River View. A fleet of 12 trucks, mostly of Hug make are kept in service at Tuscaloosa.

All dredges are suction dredges and all are equipped with 10-in. "Amsco" pumps, made by the American Manganese Steel Co. Steam drive is used in every case, even that of the latest dredge built, which was put in service in October, 1925. This dredge has a revolving screen made by the Montgomery Coal Washing Co. The others have grizzlies and gravity screens. Coal is used for fuel in all of them.

Steam is also used at the unloading plants, both vertical and horizontal boilers supplying it to hoisting engines. Each landing place is equipped with a 50-ft. boom derrick. These have a main hoist for the lift and an independent hoist for the swing in both the yards which were visited. Williams 1¼-yd. buckets are used at all landings, but the hoisting machinery varies. An Orr and Sembrauer hoist is used at the Mobile yard.

In the usual practice the dredges make only two materials, gravel and sand, which is concrete sand or building sand. When a finer grade is wanted for plasterer's or mason's sand the dredge is moved to one of the bars of the river where such sand is found. Owing to the distance that may be covered, the dredges have a wide selection of materials from which to choose.

The other officers of the company are: G. H. Little, who is vice-president and general manager, and A. T. Baugh, who is secretary-treasurer. Mr. Baugh is in charge of the Mobile office.

The Mobile office has only been established since the demand for building material along the coast and in Florida became so strong.

Measurement of the Workability of Concrete

A STUDY of the workability of concrete mixtures is being carried out at the bureau under a co-operative research arrangement with the Celite Products Co., Los Angeles, Calif. The purpose of this work is to devise an apparatus which will measure accurately that quality of concrete known as workability and to obtain this measurement in units which are used in engineering work.

Several years ago a penetration apparatus was developed in the cement section of the bureau for the measurement of workability. The apparatus consisted of a 6x12-in. cylindrical mold mounted upon a small table which can be raised or dropped about 1/10 in. by means of a cam. A spider carrying a sleeve is mounted on the top of the mold. Through the sleeve a close-fitting rod is introduced in alignment with the axis of the mold.

The batch of concrete to be tested is placed uniformly in the mold and first compacted by 30 drops of the table, then the rod is inserted in the sleeve and lowered gently into the concrete until it comes to rest under its own weight. The cam shaft is then turned and the mold full of concrete is successively raised and dropped in such a manner as to allow a reading of the penetration of the rod after each impact. The test was regarded as completed when the rod had penetrated the concrete 10 in.

As the same means were used for driving the rod through the mass as were used for compacting it, the test was not reliable for the lean and harsh working mixtures. To overcome this objection and to secure more exact measurements on all mixtures a new method has been devised for driving the rod. The new part of the apparatus is similar to a pile driver in that a weight is released from a fixed height above the rod and falling free drives the rod through the concrete without further raising and lowering of the table, once the concrete is uniformly compacted. The workability is measured by the reciprocal of the work in causing the penetration of the rod.

Tests have been made on concretes of different proportions from 1:1½:3 to 1:3:6 in which the amount of water was varied to give consistencies from a very dry mix to a wet mix. The data so far obtained showed the difference in consistency quite markedly. First the dry mix requires the most work, then by adding more water the concrete becomes more workable, until a point is reached where too much water has been added, causing segregation, and the workability is again decreased. In order to confirm this preliminary study further tests are being carried out and additional studies are being made in which a body of compacted concrete is deformed instead of a displacement of a part of the mass, as is done in the penetration apparatus.

After a method of measuring workability is fully developed, it is planned to test a wide range of concrete mixtures in which other qualities will be determined, and the relation between them and workability will be studied.—*Technical News Bulletin* of the U. S. Bureau of Standards.

Bureau of Standards 25th Anniversary

A CELEBRATION of the twenty-fifth anniversary of the Bureau of Standards of the Department of Commerce is just announced. On Saturday, December 4, next, the Bureau will keep Open House and a banquet will be given at which the many friends of the Bureau will meet the staff and reminiscences will be exchanged, the achievements of the quarter century will be reviewed, and the present and future work will be discussed. A group of distinguished guests will attend. The event is of interest to the world of science and as well to the industrial experts who have worked so closely in cooperation with the Bureau and in turn made application of its discoveries and developments in perfecting the measured control of processes. The opportunity to inspect the experimental research facilities of the Bureau will be welcomed by its many friends in industrial and professional fields.

Old and New Portland Cement Research

Crude Methods of Early Days in the Lehigh Valley and the Intensive Study of Cement of Today Compared

By Edmund Shaw
Editor, Rock Products

SOMEBODY should write a book on the cement industry of the Lehigh Valley. Of course the main historical facts about it are to be found in Robert Lesley's book on the "History of the Portland Cement Industry," but even more than the space allotted is needed to bring out the efforts that were made to launch a relatively new material in the face of prejudice and competition from established industries here and abroad. It would also be interesting to show in much detail how the crude methods of early days have developed into the precise and efficient methods of the present time.

Gate of Lawrence plant showing date of founding

An Early Soundness Test

Charles Porter, vice-president and manager of the Lawrence Portland Cement Co., told me, during a recent visit to the plant, that he remembered well when the only apparatus they had for testing was a common tin wash basin. They were making natural, or "Rosendale," cement (as it was more commonly called), and a sample, taken from each day's run, was made into a ball and placed in this wash basin. If the ball remained firm and hard after 24 hr. the cement was good. If it broke apart it was bad and the run had to be discarded. This rudimentary form of the soundness test was considered all that was necessary.

However, in the early nineties they were testing cement by much the same methods that are in use today. John Warta (pronounced War-tay), the superintendent of the Lawrence plant, was engaged in such work in the eighties and nineties and told me a lot of interesting things about it. The engineers who were to use the cement became convinced early in the game that it was necessary to know the strength of the material with which they were working and some of them made their own testing machines. Weird contrivances some of them were, made from spring balances, household scales or whatever kind of weighing device happened to be handy. Once he was called to a job where an engineer had refused to consider the "Rosendale" cement he had bought because it showed a tensile strength of only 35 lb. in seven days. When Mr. Warta came on the ground he found the testing machine to be a fearful and wonderful contrivance based on a steel yard that had seen service in a butcher shop. It was so insensitive that no results from it were worth any consideration whatever. Mr. Warta got 200 lb. 7-day tensile strength from the same sample using a regular testing machine which he had brought with him. The engineer accused him of manipulating the test to "get all there was in it," in other words to show a higher strength than could be obtained from the same cement used in concrete. To show him that this was not true Mr. Warta made briquets using a lesser amount of water and pressing the mix firmly into the molds. These broke at 340 lb. (All these tests were on neat natural cement.)

This last-mentioned test is interesting because it shows that even in those days there was some knowledge of the effect of the water-cement ratio, although, of course, such knowledge had no scientific basis until Prof. Abrams made his classic study, which involved the breaking of some 50,000 specimens, and wrote his formula.

Foreign Cements Had the Reputation

By 1894 portland cement had come into general use and Mr. Warta had at that time a list of 32 foreign cements which were being offered for sale in New York. American cement was being made but found foreign competition hard to meet. He told of one instance that illustrates this. An enginer who had charge of one of the largest jobs in the city brought him in seven cigar boxes filled with cement and said that they were samples from both American and foreign mills. It had been agreed that as a result of tests to be made on these samples the cement would be chosen for one of the largest buildings to be erected in New York.

Mr. Warta had noted that he could tell the foreign cements from the American cements by noting the character of the residue after putting the cement through a 100-mesh screen. The residue of the foreign cements was coarser and less uniform than that of the American cements. He picked two of the seven samples as of American make and found on testing that they were considerably stronger than the foreign cements. Tests were made both with neat cement and with a 1 : 3 mortar mix made with a uniform sand, although this was before the days of standard Ottawa sand. He reported the tests but in spite of his results a German cement was chosen solely on account of its long established reputation. It did not seem possible to the builders that an American cement could equal the foreign product.

The American cements that really won in this competition were made in the Lehigh Valley, one by the Atlas company, the other by the Vulcanite company.

Price War on Natural Cement

I asked Mr. Warta what in his opinion was the main reason that portland cement displaced natural cement as rapidly as it did and was surprised to hear him say that it was largely a matter of price. Although masons had begun to prefer portland because they could work with it later in the fall and earlier in the spring, natural cement held its own pretty well until the makers of portland cement began cutting prices. The price dropped to 75c and even to 65c a barrel. This was in the days when

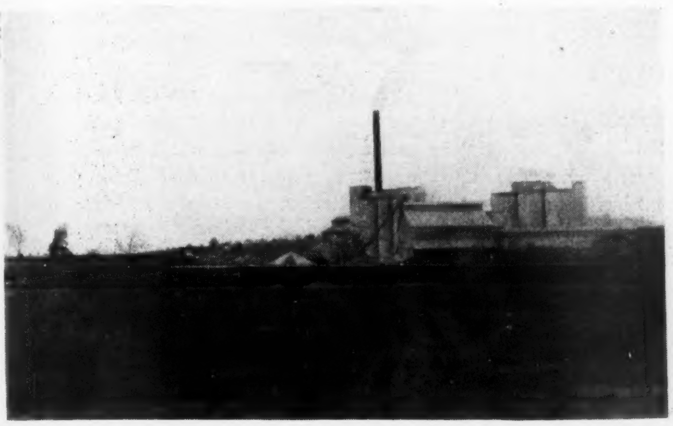
Office of Nazareth Cement Company

the fierce competition began that resulted in the failure of many plants and an injury to the industry from which it took some time to recover. But the low price had one advantage. It encouraged everyone to use portland cement freely and helped in the development of the concrete age in which we are living today.

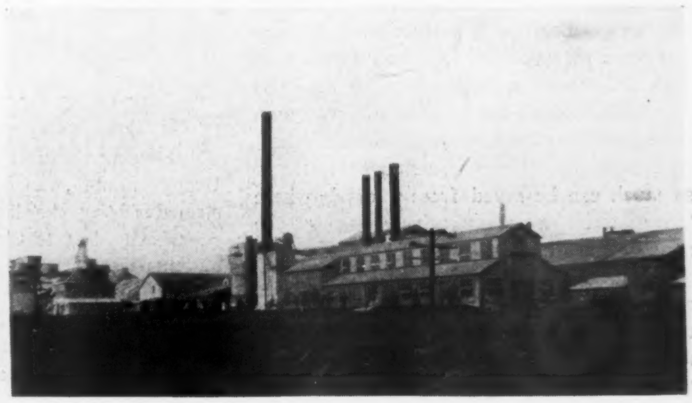
It is really astonishing how rapidly the use of concrete has spread and nothing shows it better than the growth of the Lehigh Valley cement industry. I was plants were built and the market brought within a smaller compass and yet the increase of production in the Valley kept on steadily. Much of this outside competition, however, came from the Valley producers themselves. The Lehigh Portland Cement Co., for example, is operating 20 plants, but only seven of them are in the Valley.

At present there are 13 companies there and they operate 26 plants. The Lehigh leads with its seven plants and the others Nazareth Cement Co., told me that he had noticed especially in the last year or two that portland cement was beginning to be recognized as a great basic industry like steel or railroads. Cement securities find a market as easily as any others. The readers of ROCK PRODUCTS know the position such securities have taken in the time he mentions for they have seen the list of quotations grow from a few items to almost a full page.

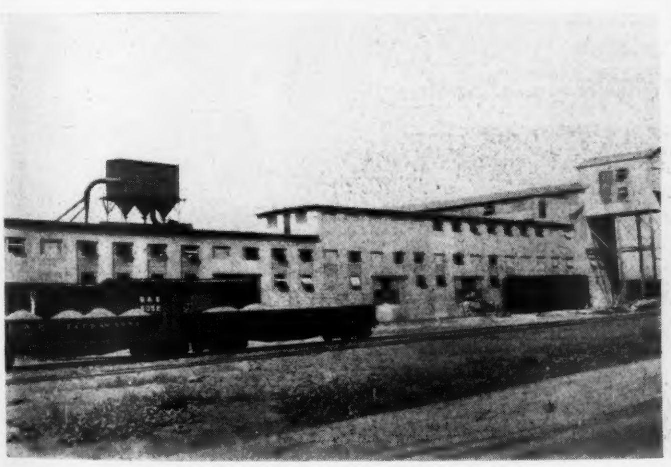
The Nazareth's new laboratory, which was



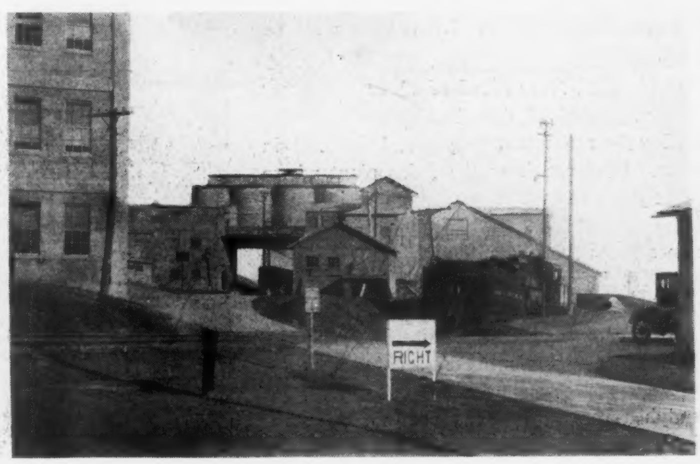
Phoenix plant built to replace one that was burned



Plant of the Lawrence Cement Co. at Siegfried



New packhouse of Edison Portland Cement Co.



Nazareth Cement Co.'s plant. New laboratory at left

shown the production figures of one of the larger plants recently. In the last year of the nineteenth century it produced a little over 16,000 bbl. In 1900 it had got into its stride and produced over 200,000 bbl. From that time on each year's production (save 1907 and 1918) showed a substantial increase until in 1925 it produced over 2,000,000 bbl. and this year's production will be well on toward 3,000,000 bbl. The increase in 25 years is not 100% but one *hundredfold,* or 10,000%, if you prefer the figures in percentages.

Other plants could show similar increases, and what makes this so remarkable is that such growth has been made in the face of strong competition. Originally the Lehigh Valley producers had the field pretty much to themselves and shipped cement for long distances. But each year more and more with the number of plants each operates are: Giant, two; Whitehall, one; Coplay, two; Vulcanite, two; Alpha, two; Hercules, one; Nazareth, one; Phoenix, one; Penn-Dixie, three; Atlas, two; Lawrence, one; Edison, one. Some of these names would be quite familiar to the reader if he knew nothing about the cement business on account of the national advertising campaigns that the companies that own them are carrying on. I could see the effect of such campaigns from a chat with a smoking compartment acquaintance whose main interest is in textiles. He said, "Why I thought most of the cement used in the country was made by the — company because I have seen their advertisements so often in the *Saturday Evening Post* and other periodicals."

But the public has learned of portland cement. George Coffin, the manager of the described in the October 2 issue of ROCK PRODUCTS, was visited on this trip and the impression left was that Mr. Driesbach, the head of the research department, had been over modest if anything in his description. Mr. Coffin told me that he felt that in building this laboratory his company was merely a pioneer and that other companies would begin to build the same sort of laboratories shortly. He looked on it as an investment that was bound to pay big dividends. I put this view of the case to the manager of another company and he concurred. The cement industry has accomplished great things but it is by no means content to rest on a record of achievement; it is going on to do better and greater things.

There is, for example, the matter of dust. One could not write of the Lehigh Valley

without mentioning it. But there is less of it in the Valley now than formerly "although I heard nobody complain about it," as Mark Twain said of the lessening of coal smoke in St. Louis. But dust collectors are going in fast and they are found to be considerable savers of money as well as reducers of the dust nuisance.

One instance of an actual test just completed will give an illustration of how much may be saved by dust collecting. A dust collector of a modern type was attached to the stone dryer of one of the well-known plants and the material collected in 17 hr. was weighed. It was a little over 14 tons and more than 90% of it passed a 200-mesh sieve. Here was material ready for the kilns that had stood all the expense of quarrying, transporting and drying which would otherwise have gone into the air to be lost. If so much can be saved from a dryer where the material is comparatively coarse one may imagine how much might be saved in the grinding and burning operations. As readers of the advertising pages know, dust collectors have been installed in connection with grinding mills, both raw and finish grind, and have proven very successful. But the matter of dust collection is by no means entirely settled to everyone's satisfaction and it is one of the subjects that is receiving considerable attention from the research men.

A New Kind of Dust

A new kind of dust has appeared in the Valley in the last two years, brick red in color. It comes from the Atlas plant where "Lumnite" cement is made and it is easily distinguished from the yellow-gray dust that comes from the other plants.

And this matter of dust brings up the question of dry vs. wet process plants. Two or three years ago it was quite freely prophesied that the wet process would eventually displace the dry, but now those who are studying cement making are not so sure. Inventions such as the pneumatic pump, the air separator and the dust collector are all favorable to the dry process. The argument that a better and more uniform cement may be made by the wet process is met by the answer that some of the best cements made in America are made by the dry process. To do this requires fairly uniform materials and constant vigilance and attention but none the less it is being done. In spite of the fact that companies have spent large sums in modernizing plants and putting in new equipment they have spent nothing in changing the process. C. B. English, manager of the Edison Portland Cement Co., seemed to voice a pretty general opinion when he told me that this investigations had convinced him that to make a change of processes would be a serious mistake as it would result in making no better cement and a higher cost.

However, those who favor retaining the dry process are willing to admit that it can be improved and this is another matter on which the research men are working. The crux of the whole matter seems to be the difficulty of getting dry material to run from a bin in a constant stream, that is, as water will flow from an orifice under a constant head. If it were possible to persuade dry materials to do this the correction of dry mixes would be as easy as that of wet mixes.

Several methods of improving present conditions have been proposed, one of which is to actually weigh the cement materials as they flow from bins in machines of the "poidometer" type.

Gravel Company Tests Pavement

THE load carrying ability of concrete pavement on the Prospect avenue road in Orange County, California, has been demonstrated during the last three and one-half years, according to tonnage figures compiled by the Orange County Rock Co. Since March, 1923, when the pavement was completed, to September 20 of this year, when the figures were taken, this company has sent 893,000 tons of sand and rock out in trucks over this road. With the tonnage from that date, the amount to the present time is estimated to have reached a figure over 900,000 tons.

Severe test of a concrete pavement

This figure does not include the weight of the trucks. For the 893,000 tons up to September 29, 178,600 5-ton truck loads were required. Each truck averages 11,000 lb., thus the tonnage of the rolling stock alone for one-way travel was 982,300 tons. With the return of the empty truck also added as traffic tonnage, the total traffic originating from this one source and passing over the concrete pavement reaches a gross tonnage of 2,857,600 tons in the 42 months period.

The Prospect avenue road paving is one-half a mile long, the concrete is 8-in. unreinforced, 20 ft. wide, 1:2:4 mix and was built by Wells and Bressler, contractors, of Santa Ana, Calif. The pavement was laid at the instigation of the Orange County Rock Co., as they donated the sand and rock. The county furnished the cement and an assessment district paid for the labor. The concrete was laid under county supervision, J. L. McBride, superintendent of highways, Orange county, in charge.

Fifth Annual Power Exposition Promises Great Features

THE educational value of the fifth national exposition of power and mechanical engineering is being developed to the utmost. This annual event, which starts on December 6 and lasts through to December 11, brings together not only the leaders in engineering and industry but a great many of the general public who desire up-to-date information about the stupendous development of applied science.

The exhibits themselves, which consist largely of working units or models, will have a great educational value. In addition the management is providing a complete program of motion pictures showing a number of the large developments which cannot be brought to the Grand Central Palace at New York for display at the time of the show.

Five hundred exhibitors will occupy the four floors of the Grand Central Palace in this great exposition of all types of mechanical equipment. Some of the exhibits will consist of heat and power generating apparatus, hoisting and conveying equipment, power transmission equipment, machine tools, refrigerating machinery and heating and ventilating machinery.

The show will be paralleled by meetings of two great American technical societies. The American Society of Mechanical Engineers at Societies Building during the first four days of the week and the American Society of Refrigerating Engineers will hold its sessions at the Hotel Astor for three days, starting Tuesday, December 7, 1926.

Improvements in Dredge Pumps*

DREDGE pumps have been considerably improved during the past 10 or 12 years. Some of the losses in head have been eliminated, and more effective head is now produced with given peripheral speeds and power than with the old types of pump. The designs made in the Office of the Chief of Engineers in recent years have larger suction openings and free passages, so that frictional resistance in the pump has been reduced. Typical designs of various types of pump are shown in Fig. 1. First, the San Jacinto pump which was generally in use prior to 1913; second, a pump for the Sacramento, used from 1915 to 1922; and, last, the O. C. E. type now in use.

The characteristic $\sqrt{2g\,H} \div V$ is as follows: Old type, 1.06; second type, 1.15; and present types of O. C. E. design, 1.20.

The characteristic was determined with equal lengths of pipe-lines when water was pumped. H is the total measured head made by the pump, and V is the peripheral velocity in feet per second of the tip of the impeller. If V is constant, then $\sqrt{H}$ in the present type is 13% more than in the old pump.

An O. C. E. design was recently installed on the pipe-line dredge *Wahalak* and the following data were taken from records of tests made with the old and O. C. E. types:

Types	R.P.M.	Velocity ft. per sec.	Discharge ft. per sec.	Length of pipe-line
Old	135	17.7	38.7	900
Old	148	15.8	34.4	1440
O. C. E.	146	19.0	41.4	1118

From the above, it will be seen that, with the O. C. E. type of pump, greater velocity and discharge were obtained with water pumped through 1118 ft. of discharge pipe than with the old type when 900 ft. of pipe were used.

Few improvements have been made that have reduced to any great extent the excessive wear on the suction side of pumps. Wear on the engine side has been reduced by closing all holes in the impeller and placing small straight vanes on the outside of the impeller shroud. The exit velocities and heads are greater for straight than for curved vanes and theoretically there should be no flow of material into the space between the shroud and casing. This is true when the vanes fit closely to the side of the casing. When worn, they should be built up again.

The problem of sealing the suction side is a more difficult one and many experiments have been made with liners of cast-iron, steel, lead, rubber and even wood for the purpose of decreasing erosion and increasing the pump efficiency without satisfactory results. Designers have, therefore, been satisfied to devote their attention to making a

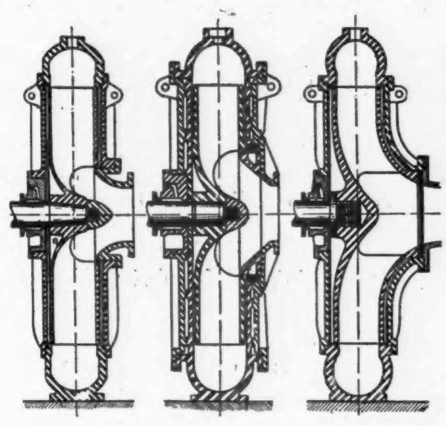


Fig. 1—Evolution of pump design to give increased efficiency

liner or wearing surface at the suction end of the runner that would be inexpensive and could be quickly renewed. In actual practice, it has been found that such liners generally are not renewed until considerably worn or until the loss in efficiency of the pump is noticed by the operators. The writer has examined pumps where one of the liners was entirely gone and the other considerably worn so that the clearance between the pump and the runner was almost 2 in. The area of clearance in this instance was at least 25% of the area of the suction pipe and, therefore, an amount of material equal to one-fourth of the quantity supplied by the suction pipe was probably being circulated between the runner and the casing, causing excessive wear with decrease in efficiency. The decrease in efficiency was due to the fact that a large amount of the material filling the space between the runner and the pump was not expelled from the pump but circulated from one side of the runner to the other, and power was expanded to keep it in motion. The quantity of material supplied by the suction pipe was, therefore, reduced, and the velocity and effective total heads decreased.

The ideal seal is one not requiring constant attention and repairs, and is efficient when the pump is badly worn. With such a seal on pumps of all the government dredges, it is estimated that there would be an annual increase in dredging capacity of from 5,000,000 to 10,000,000 cu. yd., with approximately

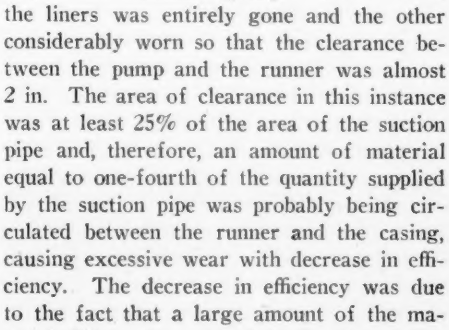


Fig. 2—Added production from increasing pipe line velocity

$500,000 a year. Such a seal, it is believed, was accidently discovered in the pumps of the seagoing hopper dredge *Raritan*, and on dredges in the first New York and Philadelphia districts.

The amount dredged was, and can still be, increased by operating the machinery to its maximum capacity. This was not considered so important in former years and, consequently, the engines and boilers were rarely worked even to their capacity. Fig. 2 shows at a glance the importance of driving the plant to its limit. When it is remembered that the cost of fuel is less than 20% of the total operating cost of the dredge, it will be seen that any increase in power is advantageous. It must be remembered that the transporting power of a stream increases with its velocity, and increased power makes increased velocity.

Again referring to Fig. 2 we see that, when the velocity was increased from 10 to 15 ft. per second, the percentage of sand transported was practically doubled, or, in other words, when dredging heavy river sand the quantity dredged at a 15-ft. velocity was about twice that at 10 ft.

When the design of a pipe-line dredge for improving the channel of the Mississippi river was undertaken in 1892 or 1893 a study was made of all the data of friction heads, wear on pipe and transporting power of streams, et cetera, available at that time, and 12 ft. per sectond was thought to be the most economical velocity for transporting sand in pipes having lengths not to exceed 1000 ft. One of the controlling items in reaching this conclusion was the large increase in friction resulting from increased velocities. At that time, the formula $h = f\,l\,V^2 \div D\,2\,g$ had been developed, but f was assumed to be a constant and was usually taken as .02 in dredge pipes of from 18- to 20-in. diameter for velocities of from 10 to 12 ft. per second. More recent experiments have shown, however, that f is not a constant but decreased as the velocity and the diameter of the pipe increase, and, consequently, the friction head does not increase as V^2. (See Table IX, page 180 Textbook on Hydraulics by Russell, 1918.) The writer has found this constant to be approximately .02 for ordinary 20-in. diameter dredge pipe at 12-ft. velocity and .015 for the same pipe at 25-ft. velocity.

The dredging plant as a whole is now kept in better repair. It has come to be realized that, in order to operate at maximum capacity, the dredge must be kept in a high state of repair. A worn dredge pump is inefficient, and for that reason the throat liners on the suction side should be renewed when there is ¼-in. or more of clearance. The efficiency of the pump decreases rapidly as the clearance at this point increases. The stuffing-box on the engine side of the pump, as well as all joints in the suction pipe, must be kept air-tight. This practice is followed by the most careful pump users and results in better work.

*From "Design and Operation of Dredges" by William Gerig, associate engineer, Office of the Chief of Engineers, U. S. Army, published in "Engineering and Contracting," August, 1926.

Modern Methods and Processes of Mining and Refining Gypsum*

Part XII—Automatic Partition Tile Machines and Their Products

By Alva Warren Tyler

In the previous article, part XI of this series, which was published in the October 16 issue, details of the first automatic tile machine and an improved type were discussed. Further consideration of improved and modernized types will be taken up in the following.

New Machine Designs

A much less elaborate design has more recently been put in practical use on the Pacific coast—using this same principle, however. In this design, wooden cores are used and the ends of the molds are stationary. The bottom plate of each mold is in one piece and the discharge pulley is hexagonal, each face being the width of one mold and crowned slightly in the center. When the mold travels over this pulley the bottom is sprung slightly. Since the ends of the mold are fixed to the bottom plate, both the ends and bottom are automatically freed from the tile.

Another type of machine has been developed in California in which the tile are cast on edge, the molds always moving in the same horizontal plane (Fig. 8). The tile (Fig. 10) are not made in the standard 12x30 in. dimensions, however.

A type of machine developed and placed on the market within the past few years, and one which promises to largely supplant the earlier conveyor type, is of circular design, the molds being one edge and all radiating from a common center. The moulds are mounted on a framework or table moving in a horizontal plan about a vertical axis. (See Figs. 9, 11 and 12.)

The advantages of this type of machine are obvious. The position of the molds on edge, makes it compact, while the fact that they are maintained in their normal working position (except for a short interval in some machines) throughout their complete revolution, makes it possible to obtain a very high percentage of working efficiency, whereas in the conveyor type the working efficiency is always less than 50%, over half of the molds being idle. Futhermore, casting the tile on edge between perfectly machined plates produces exact uniformity in thickness, besides giving both faces a very attractive appearance. See Fig. 17 for a comparison between flat and vertically molded tile.

In this type of machine both vertical and horizontal methods of coring are employed, the vertical being through the length, these terms being in relation to the tile when in

Fig. 8. Automatic tile machine in which tile are cast vertically. The cores are also vertical

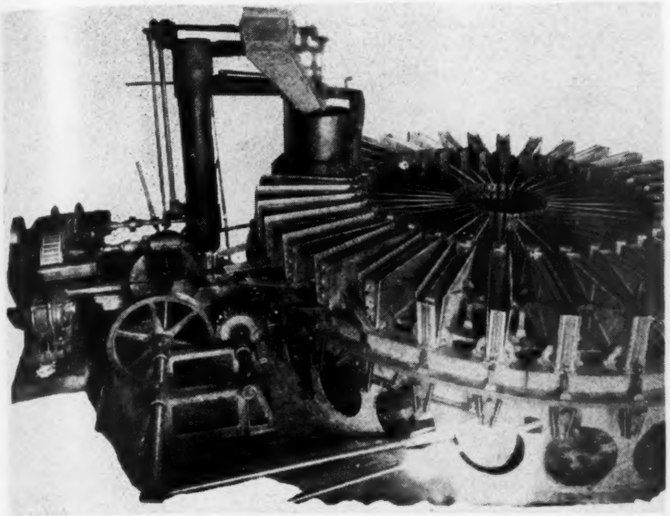
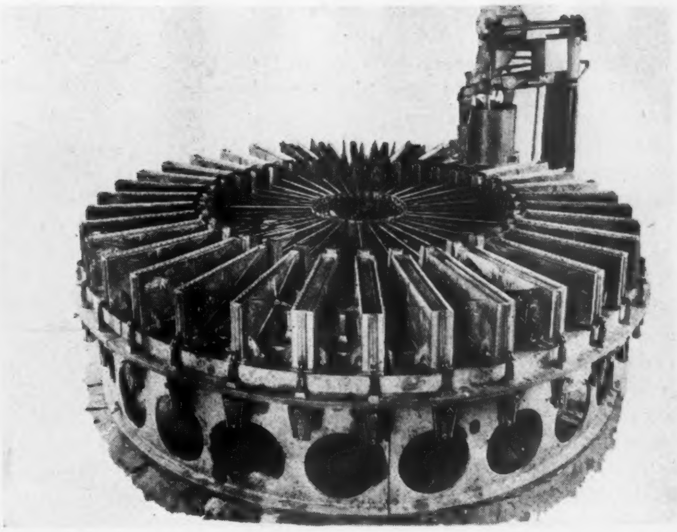



Fig. 9. Rotary gypsum tile molding machine of the single molding type. The tile are automatically pushed from the longitudinal cores shown

its position of nornal use. The coring might also be expressed as transverse and longitudinal. The tile being weakest in the direction of their thickness it will be seen that longitudinal coring is advantageous as a preventive against breakage in handling, while transverse coring gives greater strength against vertical pressure when placed in the wall. However, since any tile of standard specifications gives ample strength as a non-bearing partition and since breakage in shipping is an important item to guard against, it would seem that longitudinal coring is preferable. In any case where transverse coring is employed it is advisable that the cores do not extend all the way through the tile. This not only gives greater strength but provides one blank edge on which the mortar may be easily spread when laying the wall.

Another important feature of this type of machine is in its ability to produce practically any required size of tile merely by the interchanging of molds. For instance, on the machine illustrated molds for 2-in. solid, 3-in. hollow, 4-in. hollow, 5-in. hollow, 6-in. hollow, and 8-in. hollow tile may be placed on the machine at one

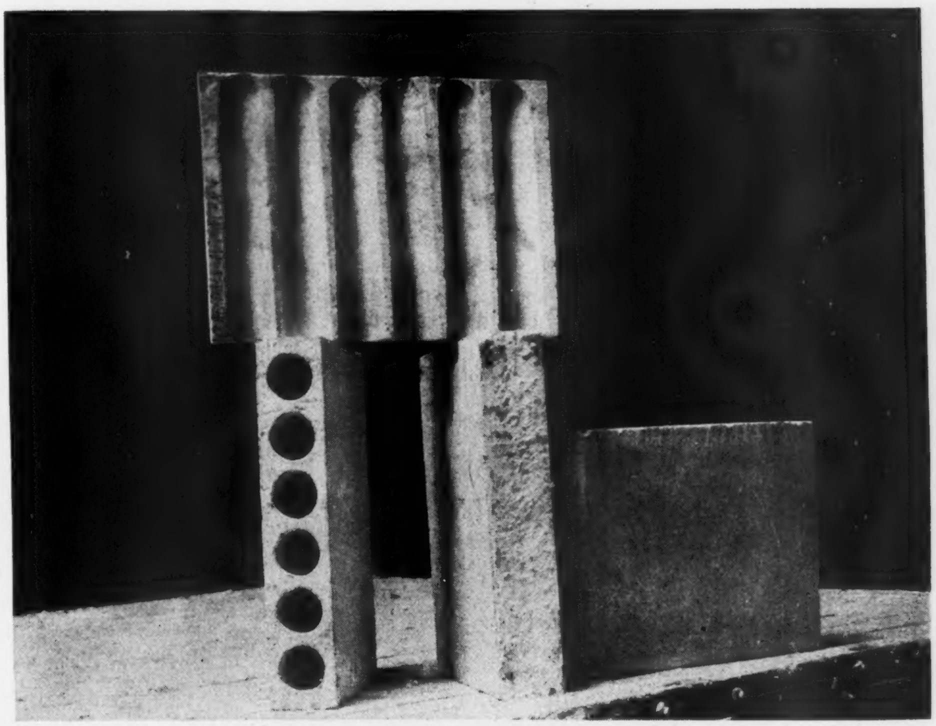


Fig. 10. Types of tile cast on machine shown in Fig. 8.

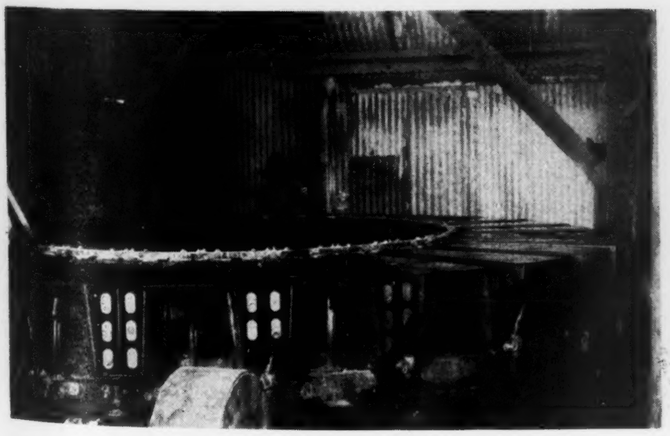
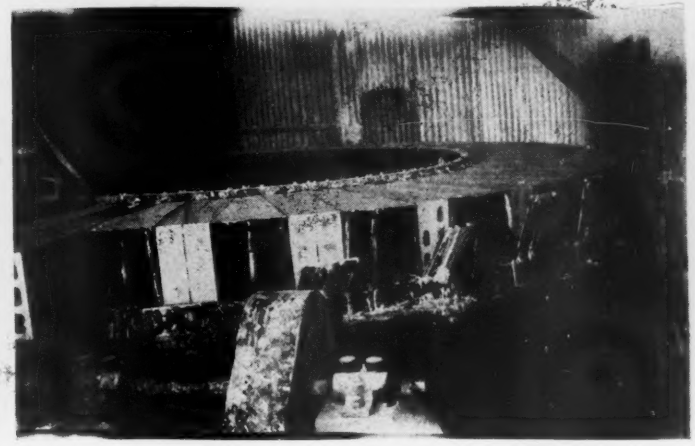



Fig. 11 Double molding type of the rotary gypsum tile machine shown in Fig. 9

time, thus producing these various sizes at each revolution. The proportion of each different size may be regulated to suit the operator and any size may be discontinued by substituting a mold of different size. It will be noted that "size" refers to the thickness of the tile only, as for any given brand of tile the face dimensions are the same regardless of thickness.

Tile machines of the circular type vary chiefly in their style of cores and method of ejection of the blocks, the blocks being pushed from horizontal cores in some cases, and the cores being withdrawn in others. In the latter case each individual mold is sometimes pivoted or hinged so that it may be partially or wholly inverted, thus allowing the tile to drop out. Vertical cores are used with the pivoted molds.

All recent tile machines of whatever type use non-corrosive metals (usually aluminum) in the manufacture of all parts coming in contact with the wet plaster mixture. This, together with a light oil spray, keeps the molds and cores clean and allows the tile to be easily ejected.

Capacities of automatic tile machines run from 1,000 to 1,500 sq. ft. per hour.

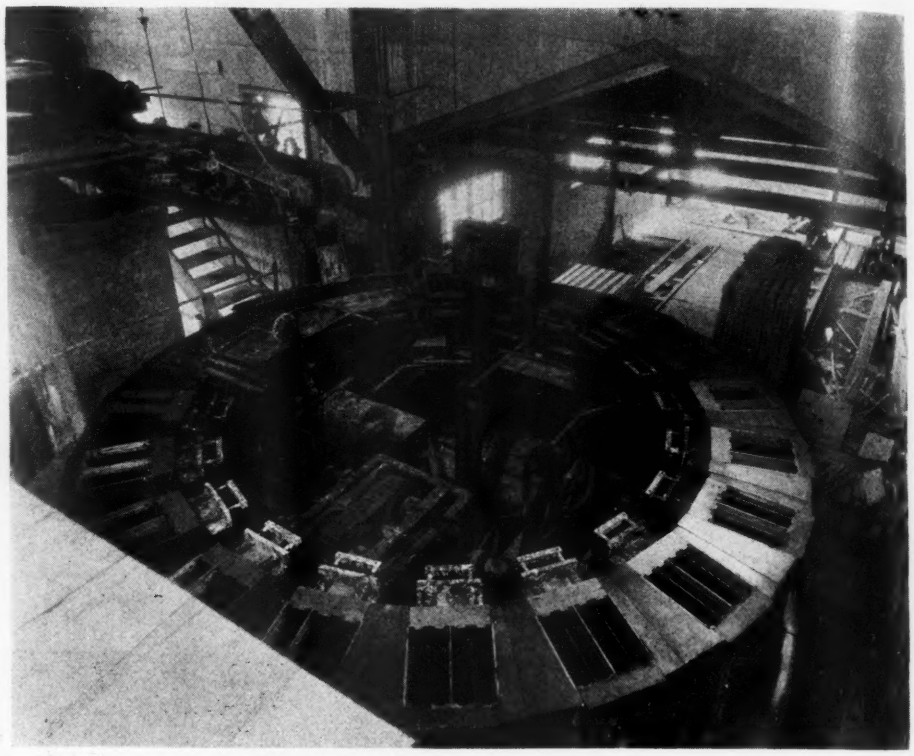


Fig. 12. Another modern type of rotary gypsum tile machine which is in use at some of the newer plants

Types of Mixers

The mixers used for preparing the wet mixture of gypsum stucco, fibre and water are an important part of the equipment required for the production of gypsum tile. The pug mill or batch mixer previously referred to is still used in connection with tile machines of the conveyor type, the time required for charging, mixing and discharging being sufficiently short as to not interfere with the continuous operation of the molds, which move very slowly—usually less than 10 ft. per min. A specially designed mixer for use with the circular type tile machine mixes just sufficient material to pour one mold (this may be a double mold consisting of two 3-in. or two 4-in. tile). Material is supplied to this mixer automatically by means of accurate proportioning devices operating in synchronism with the advance of the molds. It is really a batch mixer, but due to the thinness of the mixture and the small quantity mixed each time the operation is almost instantaneous, being completed during the time interval between the ejection of the tile in two successive molds.

Batch mixers are subject to caking of set plaster on their agitators and other internal parts coming in contact with the wet mixture, necessitating careful watching and frequent cleaning, even though these parts may be made of non-corrosive metal. A careful machine operator is usually able, however, to take care of this condition without appreciable loss of time in tile production.

A continuous type mixer which has given successful results is shown in Fig. 18. The gypsum stucco, fibre and water are delivered in a continuous, uniform stream to this machine at one end on top and the wet mixture is discharged from the bottom on the opposite end. This machine is fundamentally two stepped screw conveyors mounted in pairs and made up of accurately machined parts arranged in such a way that the machine becomes self-cleaning and therefore can never cake up with set plaster. The shell of the machine is also machined inside and is automatically cleaned by the rotating mixing screws. There is never any great quantity of the mixture in the machine at any one time and all that is necessary when shutting down is to flush out with water. This mixer is applicable in the manufacture of both gypsum tile

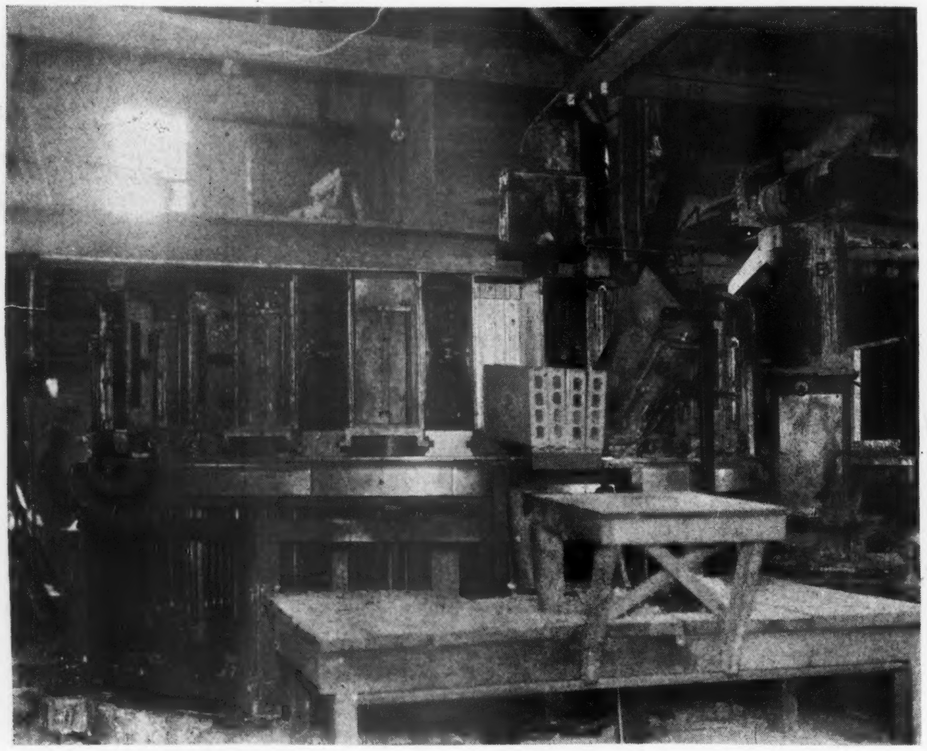


Fig. 13. Showing the discharge end of the rotary machine pictured in Fig. 12

and wall-board and is probably the best type of machine for the purpose so far placed on the market.

Types of Dryers

Gypsum tile of whatever nature, when first set from the wet mixture, contain a large quantity of excess moisture, running approximately 30% in partition tile. This must be driven off by drying.

The drying operation is accomplished in two ways—by positive mechanical dryers and by open-air drying.

The type of mechanical dryer or kiln

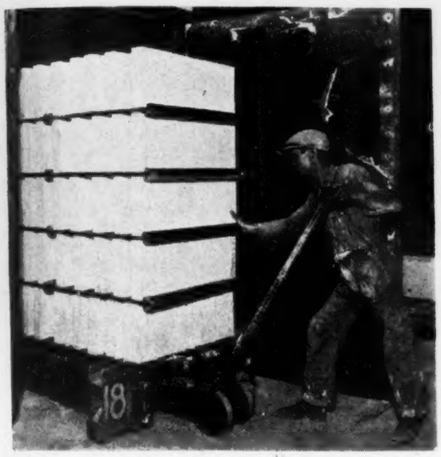


Fig. 14. Placing green tile made on machine shown in Fig. 8 in the drying kilns

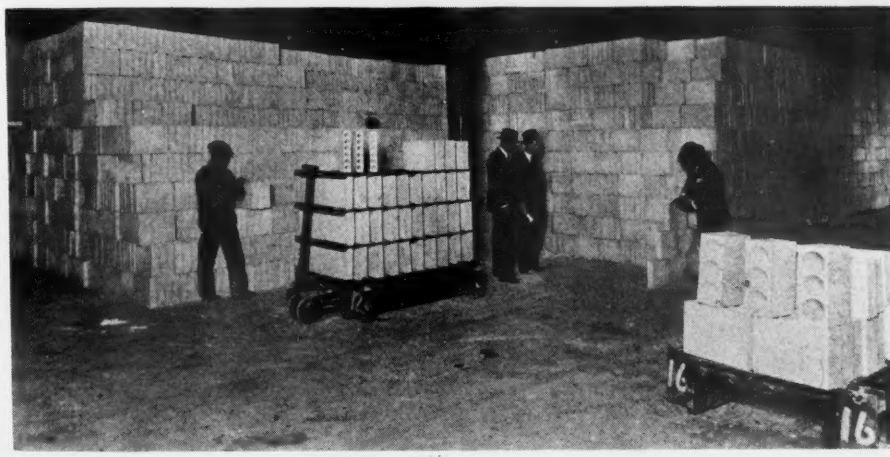


Fig. 15. Stacking cured gypsum tile in storage. The tile were made on the machine shown in Fig. 8

used almost exclusively since the beginning of the gypsum tile industry has been of the well known tunnel design, which until very recently has undergone but little change. The tunnels, as the name indicates, are long narrow passages, the walls of which are of masonry or concrete and covered with reinforced concrete, usually further insulated either with gypsum tile or a gypsum slab poured in place. Double tracks of light steel rails are usually provided so two trains of cars of tile may be run side by side through the kilns. The kilns are heated both by direct and indirect heat. In the past the indirect method has been used almost exclusively, due to the fact that often exhaust steam was available for use in drying, thus greatly reducing the cost of this operation, and furthermore direct methods were unsatisfactory due to both difficulties in temperature regulation and discoloration of the tile. In the indirect system, steam coils were placed in the intake of a large blower. Air drawn through these coils by the blower was heated to the proper temperature, then blown through the kilns and allowed to escape to the atmosphere at the opposite end, carrying with it whatever moisture it could gather during its passage. A temperature of 140 deg. F. to 160 deg. F. was maintained in the kilns, this being considered about the maximum allowable without risking recalcination of the tile. When there was an insufficient quantity of exhaust steam, or none at all, live steam had to be provided.

In recent years considerable improvement has been made in kiln design, resulting in much higher efficiency in the drying operation. This improvement has been accomplished chiefly through a recirculation of a part of the air formerly

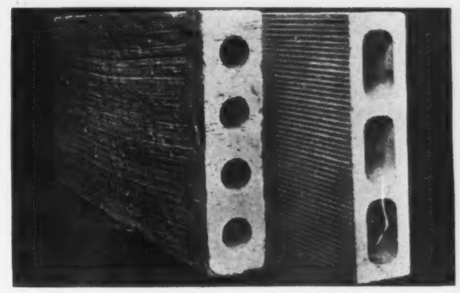


Fig. 17. Comparison of flat and vertically molded gypsum tile. Top surface of the flat cat tile is scored by hand

exhausted from the kiln, it having been found that this air was not only far undersaturated but that by reheating and returning with a properly regulated volume of fresh air a much higher kiln temperature could be maintained without danger of injury to the tile—due to the initial moisture content of the incoming air. Thus considerable saving has been made in heat values formerly wasted, besides producing air volumes having greater moisture-carrying capacity.

Direct Heat Drying

In spite of the apparent impracticability

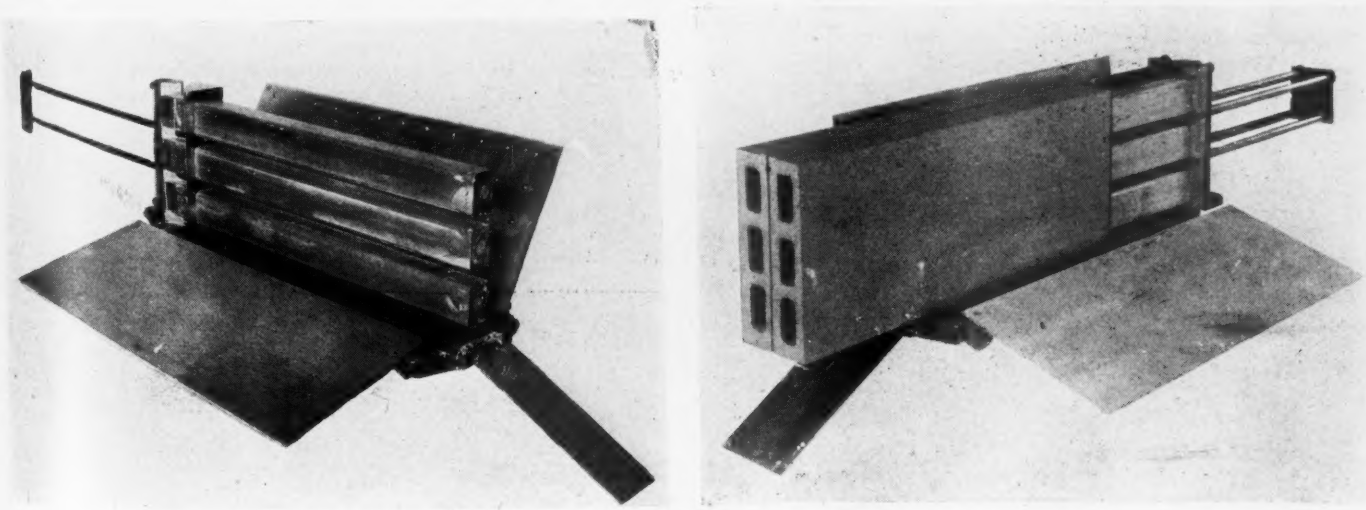
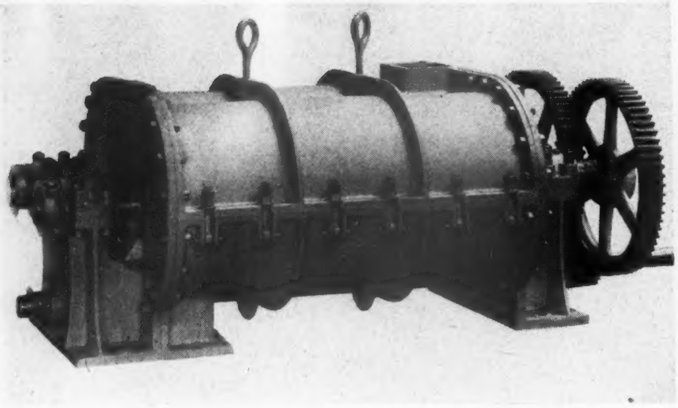


Fig. 16. Details of the single molding unit (left) and double molding unit (right) used in the tile machine shown in Figs. 9 and 11 respectively. Cores and side plates are of aluminum and the front plate of brass



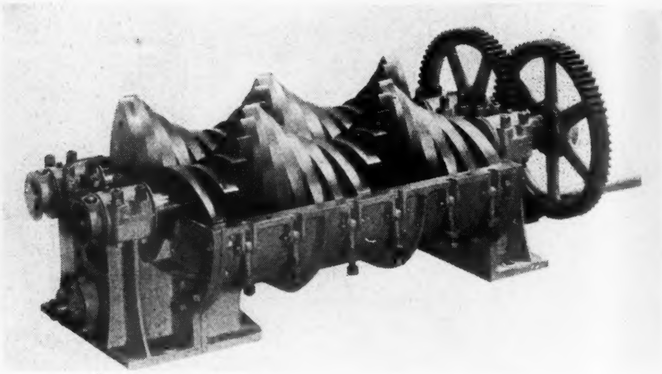


Fig. 18. Continuous wet mixer (left) used for mixing materials for gypsum tile, plaster and wall board. At the right is shown the mixer with cover removed to show internal construction

of direct heat methods of drying gypsum tile, its possibilities have always held a fascination for the designer, since its accomplishment would mean far greater efficiency than has been previously obtainable. Recent developments would indicate that the problem has a solution, if in fact it has not already been solved. It is stated on good authority that a direct heat dryer has just been put in operation which has proved a complete success. If this equipment survives the test of time we may expect soon a definite lowering of drying costs of all structural gypsum products.

Auxiliary Open Air Drying

The open air method of drying partition tile has been used as an auxiliary to the mechanical dryer for many years. A large storage yard is necessary to its success, as the tile are moved directly from the molds to the yard and left until wanted for shipment. They are then moved to the cars without any intermediate rehandling. The yard serves also as a flexible link between the machine operation and shipping requirements, giving a more uniform and efficient production.

In the eastern and middle western sections of the country outdoor drying serves its purpose during the summer months only, while in California practically all gypsum tile drying is done out-of-doors. In the Imperial Valley particularly, all drying is done in the open air, it requiring from 4 to 5 days for the tile to become completely dry. (See Fig. 19.)

The method of handling gypsum tile from the molds to the dryers has been intimated. The complete description has been purposely left until the last. In general it may be said the tile are taken from the molds and placed directly on the kiln cars. In the hand-molding system the molder did this work, besides performing all the other intermediate operations. In the car system this operation was the last of a series performed by a number of different workmen. In the machine molding process it is the only hand operation before the dryer, except in special cases where insertion of reinforcing or troweling of molds is necessary. The kiln

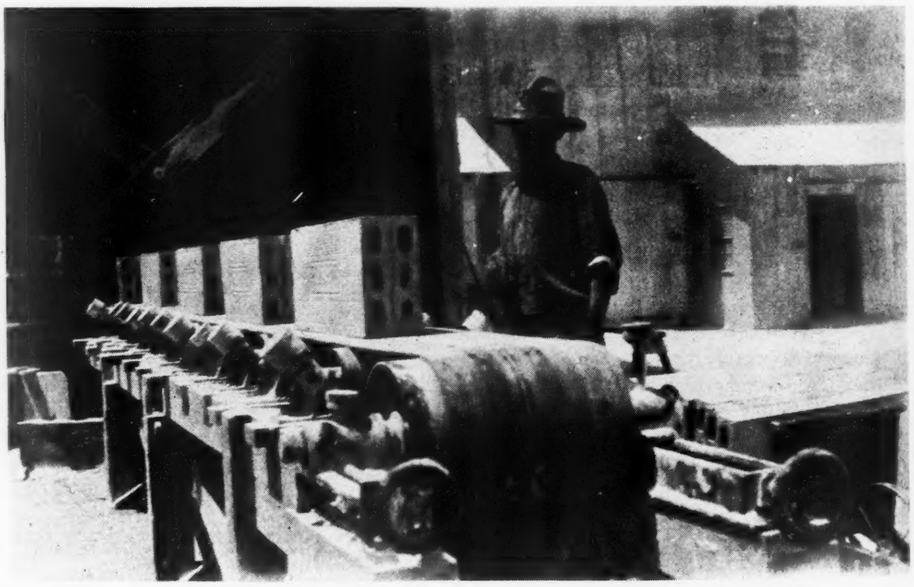


Fig. 20. Coming off machine used in connection with circular tile machines shown in Figs. 9 and 11

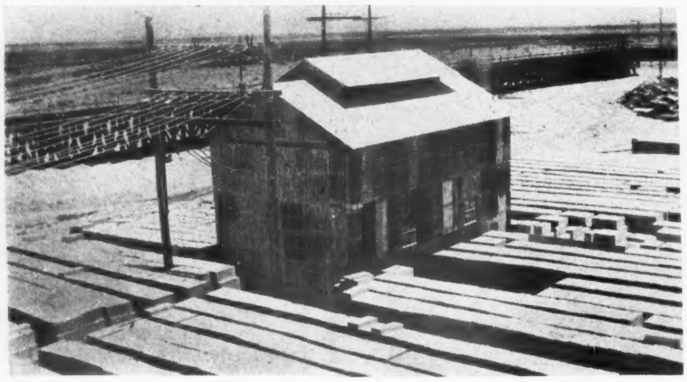


Fig. 19. Drying gypsum tile in the Imperial Valley, California. No mechanical dryers are used

cars are small steel cars, usually with handles at either end by means of which the cars may be easily pushed when loaded. The tile are placed on edge, the length of the tile with the length of the car, the car being designed to take two tile lengths and about 10 to 12 3-in. tile in width. They are usually piled five tile high, the kiln being designed for this height including the height of the car. Strips of wood are placed between tiers to bond them together and give the necessary stability when being moved. Where a number of drying kilns are operated together with open air storage, a transfer car is necessary. The transfer car operates at right angles to the length of the kilns. A section of kiln car track is mounted on its frame work, the transfer car track being depressed so that this section levels with all kiln car tracks. In operation the kiln car is rolled onto the transfer car, by means of which it is then transferred to any kiln or yard position. Kiln car tracks also serve the warehouse from the dry end of the kilns, as all kiln-dried tile are either delivered directly to the cars for shipment or to covered warehouse storage.

Simpler Method of Handling

Where local conditions permit, a simpler and more efficient system may be used for handling the tile to and from the outside storage. This is a belt and gravity conveyor system, the belt receiving the tile directly from the molding machine and discharging to a gravity conveyor placed at right angles at any point throughout the length of the belt. Assuming that the belt runs the full length of the storage yard the tile may then be placed at any point within the yard with the help of not more than one man deflecting the tile from the belt to the gravity rolls—and even this operation may be made automatic. Two to three men can easily handle the tile from the gravity conveyor to the storage pile. The tile are handled from the yard to the car in the same way, that is, by means of the gravity rolls to the car, delivering at this point to a short inclined motor driven belt conveyor which delivers directly into the car.

Fig. 21 is an outline diagram showing a typical layout for a gypsum tile plant using the old car molding system. In modern plants the molding car tracks are eliminated, the automatic tile machines having almost entirely displaced this system, resulting in a considerable saving of space. Increasing efficiencies in the drying operation promises to decrease materially the number of drying kilns for a given capacity. Otherwise the modern plant layout is essentially the same.

(*To Be Continued*)

California Triples Consumption of Gypsum Within Year

CONSUMPTION of gypsum in southern California has been practically tripled over that of a year ago, according to figures gathered by Edward Fearney, research engineer of the Plastoid Products Co., Los Angeles, and recently printed in the Los Angeles (Cal.) *Commercial News.*

Almost 90,000,000 square feet of gypsum plaster lath is being consumed in Los Angeles and the territory immediately adjacent alone, in addition to hollow tile and other gypsum materials. The manufacture of these gypsum building materials has created a demand of from 100,000 to 150,000 tons of gypsum annually.

This enormous gypsum consumption, R. M. Greenleaf, vice-president and general manager of the Plastoid company, attributes to the direct growth of the rising standards of home construction in the southland.

U. S. Government Specifications for Gypsum Wall Board

U. S. Bureau of Standards has issued bulletins No. 210 and 211 containing master specifications No. 285 and 284 to govern the purchase of gypsum wall board by the departments of the United States. Copies may be obtained from the Government Printing Office, Washington, for 5c.

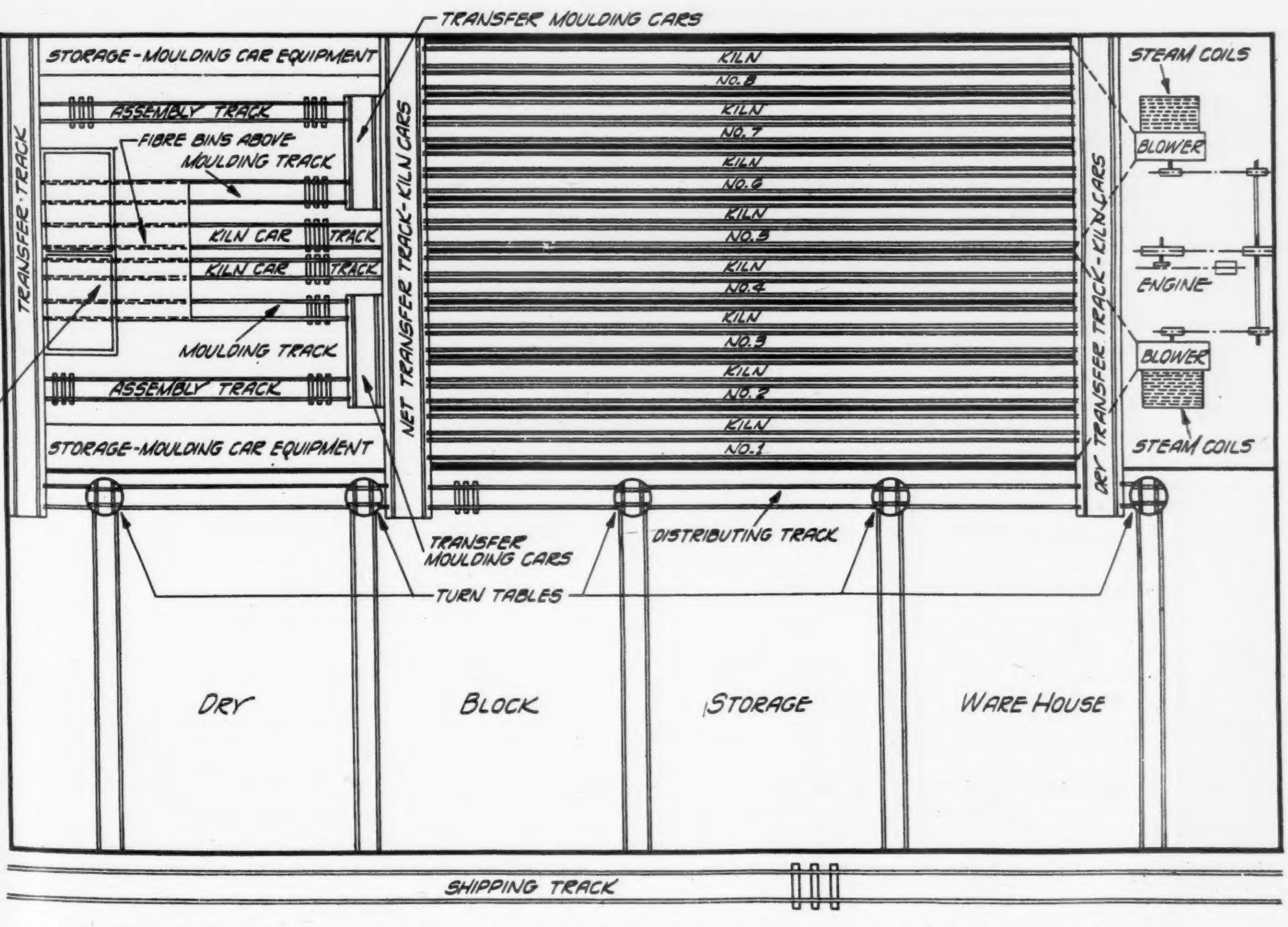


Fig. 21. Outline diagram showing typical layout for a gypsum tile plant using the old car molding system

Effect of Time and Temperature of Burning on the Properties of Lime*

By R. T. Haslam and E. G. Hermann
Chemical Engineering Department, Massachusetts Institute of Technology, Cambridge, Mass.

The effect of time and temperature of burning on the properties of lime have been studied. Two limestones were used, one an Eastern stone not usually considered to be capable of producing a plastic hydrate, and the other an Ohio stone that does give a plastic hydrate. It has been found that there is an optimum temperature and time of burning for the production of the most plastic lime and that these optimum conditions produce a very plastic hydrate from each limestone. Rate of interaction of the lime hydrates with acid, the rate of settling, and volume of putty all vary with the plasticity. The indication is that fineness of the hydrate particles is an important factor in producing a plastic hydrate.

Although lime burning is one of the oldest chemical industries, little definite information regarding it is available. For example, it is a commonly accepted fact that wood-burned lime is better than that burned with coal. The reasons given for this superiority are legion, the most frequent ones being the effect of the large amount of water present in the wood and lack of sulphur. The moisture in the wood was believed by the authors to be an important factor; however, not of itself, but because it lowered the temperature of the flame. The present investigation was based on this belief—namely, that the most important factor in lime burning is the temperature at which the lime is burned. As the investigation proceeded, the effect of time of burning was studied because the temperature effect did not offer a complete explanation.

Limestones Investigated

The two limestones studied in this investigation were (1) an Eastern stone that usually gives a nonfinishing hydrate when burned commercially, and (2) an Ohio stone that is used to produce a plastic finishing hydrate. The analyses of these two limestones are as follows:

	Eastern limestone per cent	Ohio limestone per cent
CaO	34.35	30.63
MgO	14.45	20.60
Al_2O_3	2.63	0.26
Fe_2O_3	0.81	0.30
SiO_2	3.43	0.28
Loss on ignition	44.50	47.96

Procedure

Preparation of Sample—The limestone was received in large lumps and these were crushed down to an average size of from ¾ to 1 in. in a Dodge crusher, the fines being discarded.

Calcination—The limestone was calcined in the electric resistor furnace shown in Fig. 1. It was possible to hold the temperature constant to within 25 deg. F. without any trouble, and with care this could be regulated to within 10 deg. F., by changing the pressure on the electrodes or throwing the power switch on and off.

After the desired temperature was reached and the furnace had had time to heat evenly, 5 lb. of the prepared limestone were dumped into the clay-graphite, porcelain-lined crucible. This cooled down the furnace, and a maximum of 30 minutes was required to bring the furnace and its contents back to the desired temperature.

Numerous preliminary runs were made to determine the best size of stone and shortest time necessary for complete calcination at the lowest temperature used, 1800 deg. F. This was found to be ¾- to 1-in. stone and a time of 3 hours. Time was reckoned from the moment the limestone was placed in the furnace until the power was shut off and the cooling had begun. At the end of the 3 hours the power was shut off, the top of the furnace removed, and the lime allowed to cool to room temperature. After cooling it was removed and ground to pass through a 10-mesh screen and then put into tightly covered tin cans to prevent air slaking. The other runs with varying times and temperatures were made in the same manner. Temperatures were measured by means of an optical pyrometer.

Hydration of Lime—A weighed amount of the lime was placed in a tin can set into a basin of running cold water. On the assumption that the composition of the lime was 90% CaO, enough water was measured out to hydrate the lime, with 50% excess to take care of evaporation. The water was added slowly and the mass was vigorously stirred to prevent the formation of lumps and local overheating. The hydrate formed was set aside in glass containers for one day to age, after which it was ready for analysis and testing. This procedure produced a dry hydrate.

Determination of Plasticity—This was carried out according to the method outlined by the American Society for Testing Materials.[1] Briefly, the method was as follows: Three hundred grams of lime were

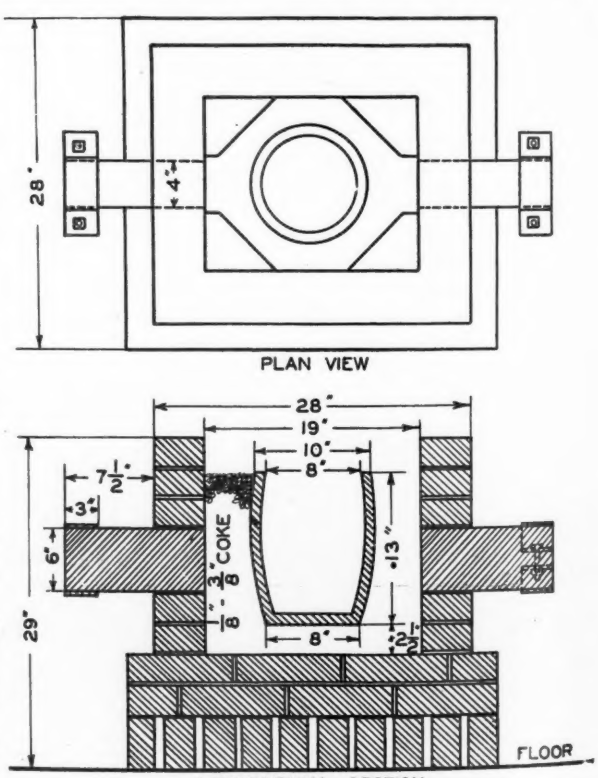


Fig. 1—Longitudinal section and plan view of electric furnace used for calcining limestone

[1] Standard Specifications for Hydrated Lime for Structural Purposes, Serial C-6-24, p. 715 (1924).

*Presented at the Eighth Annual Convention of the National Lime Association, French Lick, Ind., June 10, 1926, and reprinted from *Industrial and Engineering Chemistry*, **18**, 960 (1926), by special permission.

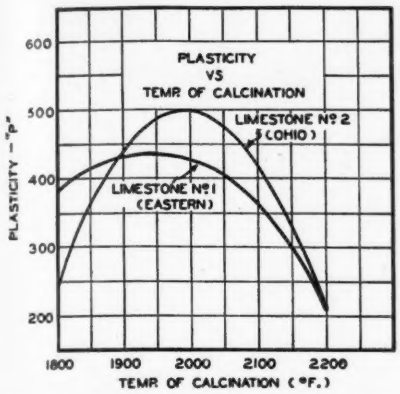


Fig. 2—Effect of calcination temperature on plasticity of resulting hydrate

hydrated as above, but instead of aging were immediately formed into a putty by adding a sufficient quantity of water. This putty was allowed to soak in a beaker covered with a damp cloth for not less than 16 nor more than 24 hours. It was then molded in a rubber ring such as is used with a Vicat needle, resting the specimen on a glass plate.

The needle used was a modified form of the Vicat needle, made of a piece of aluminum tubing 12.5 mm. in diameter and filled with shot to weigh 30 gm. The lower end was closed without shoulders or curvature. It was mounted in the Vicat needle stand. The initial reading was taken with the bottom of the needle in contact with the surface of the specimen; the final reading was taken 30 seconds after the plunger was released. A penetration of 20 mm. was considered standard, with a permissible variation of 5 mm. on either side. If the penetration was less than standard, the sample was removed from the mold, mixed with more water, and retested. If the penetration was more than standard, the sample was discarded and a new one prepared.

Plasticity Tests

The sample was then ready for testing for plasticity. This was conducted on an improved form of the Emley plasticimeter, the constants of which were as follows:

Absorption of porcelain base plate, 20% to 25%.

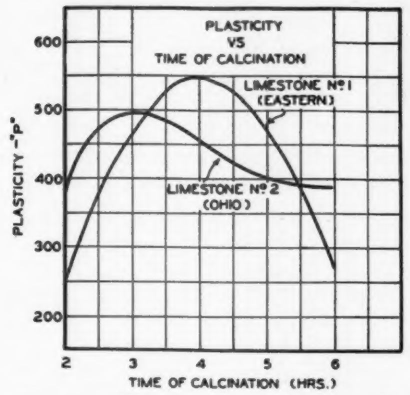


Fig. 3—Effect of time of calcination on plasticity of resulting hydrates

Dimensions of porcelain base plate, 1 in. thick and 4 in. in diameter.

Dimensions of disk, 1/32 in. thick and 3 in. in diameter.

Speed of vertical shaft, 1 revolution in 6 minutes, 40 seconds.

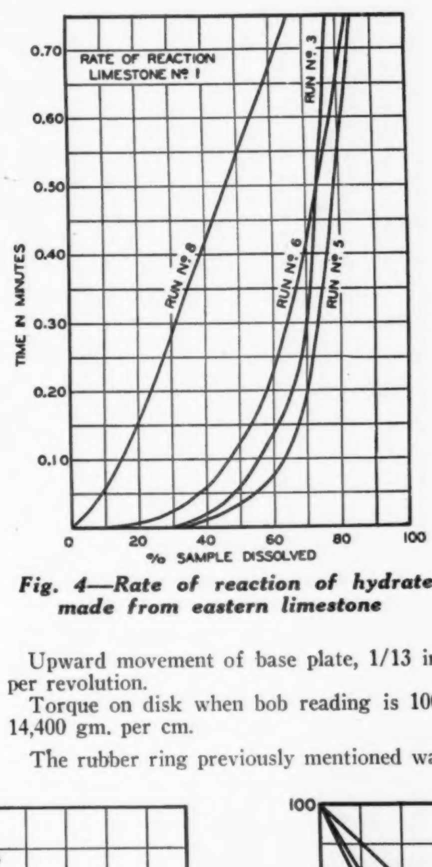


Fig. 4—Rate of reaction of hydrate made from eastern limestone

Upward movement of base plate, 1/13 in. per revolution.

Torque on disk when bob reading is 100, 14,400 gm. per cm.

The rubber ring previously mentioned was lubricated with a thin film of water placed on a porcelain base plate filled with the paste and struck off level. The mold was removed by raising it vertically without distorting the paste. The base plate and paste were placed in the instrument and the carriage turned up by hand until the surface of the paste was in contact with the disk and the distance between the disk and the top of the base plate was 1¼ in. The carriage was then thrown into gear and the motor started exactly 120 seconds after the first portion of the paste has been put into the mold. The time when the first portion of the paste was put into the mold was recorded as zero time. Care was taken to protect the specimen from drafts during the test. The scale reading was recorded every minute until the test was completed.

The test was considered complete when

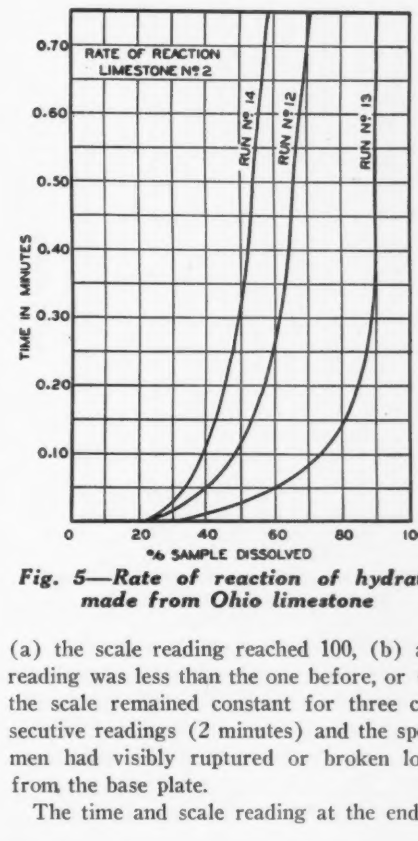


Fig. 5—Rate of reaction of hydrate made from Ohio limestone

(a) the scale reading reached 100, (b) any reading was less than the one before, or (c) the scale remained constant for three consecutive readings (2 minutes) and the specimen had visibly ruptured or broken loose from the base plate.

The time and scale reading at the end of

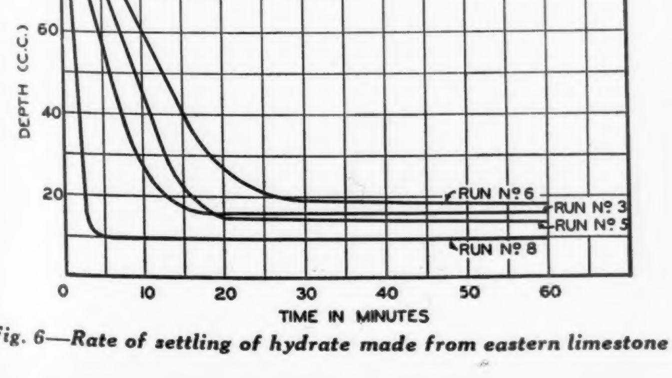


Fig. 6—Rate of settling of hydrate made from eastern limestone

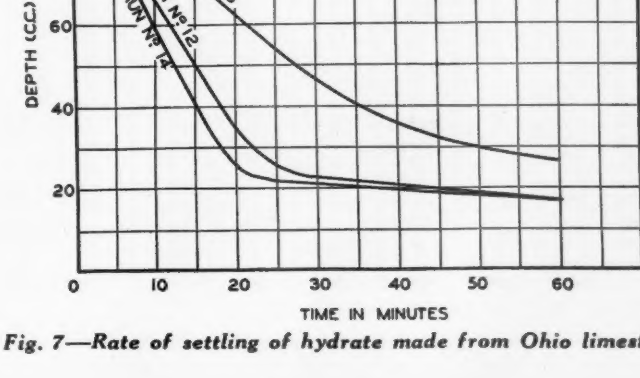


Fig. 7—Rate of settling of hydrate made from Ohio limestone

the experiment were noted. The plasticity figure was calculated from the formula

$$P = \sqrt{F^2 + (10T)^2}$$

in which P is the plasticity figure, F is the scale reading at the end of the experiment, and T is the time in minutes from when the first portion of the paste was put into the mold to the end of the test.

After each test the porcelain base plate was washed with hot water, treated with dilute hydrochloric acid to remove any lime from the surface pores, washed again with water to remove the acid, dried by heating above 100 deg. C., and cooled to room temperature before it was used again.

Rate of Slaking—Ten grams of the lime were placed in a 200-cc. tall-form beaker set into an insulating layer of kieselguhr, and vigorously stirred with a thermometer to obtain the initial temperature. At zero time, twice the weight of the water (20 gm.) was added to the lime, continuing the vigorous stirring. Temperatures were read every 15 seconds until the maximum had been reached and the cooling rate had become uniform. The maximum temperature and the time required to reach it were noted.

Volume of Putty—One hundred grams of the lime were hydrated and brought to the working consistency (as defined in the plasticity determination) and the volume noted.

Rate of Settling—This was done by the Holmes, Fink, and Mathers method, where 10 gm. of the hydrate were placed in a 100-cc. graduate (2.58 cm. internal diameter), filled to the 100-cc. mark, and allowed to settle, readings being taken every 5 minutes.

Rate of Reaction—This was done by the Whitman and Davis method, which consists in measuring the rate of interaction between the lime and hydrochloric acid.

Results

Table I shows the effect of the temperature of burning on the plasticity, rate of slaking ("quickness"), and volume of putty from both varieties of limestone. Table II shows the effect of time of burning these limestones on the plasticity of the hydrate produced from the resultant quicklime, the temperature of burning being maintained at 2000 deg. F.

On account of the importance of plasticity and to afford a better comparison, the effect of temperature of burning the two limestones on the plasticity of the resultant hydrates is shown in Fig. 2, while the effect of time of burning is shown in Fig. 3. Other data are given in Figs. 4 to 7.

Discussion of Results

It was somewhat surprising to find the limestone (Ohio) that commercially produces a finishing hydrate just as susceptible to temperature of burning as the one that does not (Eastern). The runs dealing with the effect of time of burning indicate that, while each limestone is sensitive to temperature, the one that commercially produces a plastic hydrate is not susceptible to a variation in the time of burning. This fact may explain the relative ease of producing plastic hydrates from some limestones.

In almost every case, for a given limestone, the greater the plasticity of the resultant hydrate, the faster is the rate of reaction with hydrochloric acid, the slower the rate of settling, and the greater the volume of putty. These facts indicate that the fineness of the hydrate particles is a controlling factor in the plasticity of lime—the finer the particles the more plastic the hydrate.

For factory control it should be practicable to use the rate of settling, a very quick test, as a check on the plasticity of the hydrate produced from a given limestone.

It is also interesting to note that from a given limestone, the lime with the fastest rate of slaking—i.e., the quickest lime—produces the most plastic hydrate. This is not necessarily contrary to opinion prevailing in the industry, because this statement refers only to any given limestone.

Conclusions

1. The temperature at which a limestone is burned has an important bearing upon the properties of the resultant hydrates. In the laboratory a very plastic lime was made from limestone usually considered to be incapable of producing a plastic finishing hydrate.

2. Time of burning is of equal or greater importance—i.e., the properties of the resultant quicklime are greatly influenced by the time of burning.

3. For the limestones studied, 2000 deg. F. gives hydrates having the maximum plasticity and volume of putty and the slowest rate of settling.

4. The Ohio limestone, producing commercially a plastic finishing hydrate, does not seem to be sensitive to time of burning, whereas the Eastern limestone, not usually considered as producing a plastic hydrate, is quite sensitive.

5. For a given limestone the plasticity of the hydrate seems to increase with increasing volume of putty, increasing rate of interaction with acid, and decreasing rate of settling—all of which indicates that fineness of hydrate particles is an important factor in producing plasticity.

Electric Kilns for Lime Manufacture

SEVERAL attempts have been made to use electricity for burning lime, because electric furnaces are capable of a very accurate control and are free from some of the variations in temperature which necessarily occur when fuel is used. Such furnaces are of two types:

(a) Those in which the "arc" is formed with two electrodes and the material to be heated is passed through the arc in a steady stream. Such furnaces are exceedingly powerful and readily attain extraordinarily high temperatures, but they are not suitable for burning ordinary lime.

(b) Those furnaces in which the heat is produced by passing an electric current through a *resistance* which thereby becomes heated. For lime-burning such furnaces are very effective but extremely costly in running expenses.

Under ordinary circumstances, electric furnaces are not suitable for lime-burning, as the cost of current is much greater than that of fuel, except in those localities where fuel is almost unobtainable. The cost of installation is also very high.

For the production of "fused lime" electric furnaces may be employed satisfactorily and they are also used extensively in the manufacture of various lime products, such as calcium carbide, where very high temperatures are required, but these require conditions very different from those needed in burning ordinary lime.

Electrically fused lime has attracted some interest as a refractory material suitable for lining furnaces used in the basic process of steel manufacture. The fused material behaves very differently from quicklime; it hydrates with extreme slowness even when boiled with water. At present it is too costly for extended use.—Alfred B. Searle, in *The Stone Trades Journal* (England).

TABLE I.—EFFECT OF TEMPERATURE OF BURNING

Run	Temp. deg F.	Time hours	Plasticity $P = \sqrt{F^2+(10T)^2}$	Max. temp. deg F.	Rate of slaking: Minutes to reach max. temp.	Volume of putty Cc./100 g.
			Eastern Limestone			
1	1800	3	195	....	....	......
2	1800	3	410	171	0.50	192
3	1800	3	342	160	0.75	170
4	2000	3	398	171	0.25	240
5	2000	3	454	175	0.25	220
6	2200	3	198	98.5	13.0	180
7	2200	3	217	....	....	......
8	2400	3	......	81	5.0	100
			Ohio Limestone			
12	1800	3	241	128	3.00	170
13	2000	3	493	183	0.50	250
14	2200	3	206	72	2.50	165

TABLE II.—EFFECT OF TIME OF BURNING

Run	Temp., deg. F.	Time, hours	Plasticity
	Eastern Limestone		
9	2000	2	243
8 and 9 (av.)	2000	3	426
10	2000	4	550
11	2000	6	270
	Ohio Limestone		
15	2000	2	371
16	2000	4	450
17	2000	6	395

Suspensions of Industrial Dusts in Air*

Laws of the "Aerosols" Formed by Mixtures of Fine Particles and Air, with Notes on Dust Collection

FINELY divided particles suspended in a gas or liquid form what are known as systems; that is the particles together with the medium in which they are held make a unit which has certain laws and characteristics of its own. Where the finely divided particles are separated from one another such systems are called sols. In water or other liquids they are called hydrosols, or simply sols; in air or other gases they are called aerosols. When the particles are brought together in a liquid they form what are known as gels, but in air such "masses" are spoken of as flocs or agglomerations.

Aerosols may be divided into "dusts," "clouds" and "smokes" or "fumes." The difference is determined by the size of the particles of which the system is composed. All the particles are of materials heavier than air and they would fall at the same rate if it were not for the frictional resistance of the air. But on account of this resistance they fall at different rates, according to their size, and this variation at falling rates differentiates them.

Dusts are composed of particles which are large enough to fall at *a slightly increasing velocity*. Clouds are made up of smaller particles which fall at a *constant velocity*. The velocity at which they fall is constant because the force F of gravity, which impells them downward, is sufficiently opposed by the frictional resistance R which retards them. The limit of velocity is reached when $F=R$, after which the falling rate is constant.

With the very small particles of smokes and fumes the diameter of the particle is comparable with the length of the mean free path of the molecules composing the gas in which they are suspended. The impact of the gas molecules takes the form of a bombardment which drives about the particles of the smoke or fume in what is called the Brownian motion, familiar to those who have studied colloidal chemistry.

These aerosols present the striking phenomenon of a substance perhaps two or three thousand times as heavy as air forming what is for practical purposes a permanent suspension in air. The increased buoyancy helps the material of which it is composed to exercise with maximum effect the increased chemical and physical activity that comes from the great area of exposed surface.

This *great area of exposed surface* is the principal characteristic of aerosols, upon which their chemical and physical behavior depends. The surface is so great that many more molecules are brought into contact with the air than in the case of an ordinary solid which increases the chemical effect. As electrical charges reside on the surface of a body, the capacity for retaining electrical charges is enormously increased by dividing the body into these very fine particles.

*Abstracted from "Aerosols in Industry," a paper by W. E. Gibbs, D.Sc., read at the Oct., 1925, meeting of the (British) Society of Chemical Industry.

Editor's Note

THE DUST PROBLEM is one of the most baffling that many rock products manufacturers have yet to solve. In the case of the portland cement industry, for example, the wet process of manufacture is often justified rightly or not, on no other ground than that it is a comparatively dustless operation.

Cement, lime, gypsum and stone dusts generally are not only objected to as nuisances by neighbors, but actually represent the products and profits of the plant, so that their recovery in most instances is a recovery of marketable, useful and profitable material.

The article on this page is a simply-worded abstract of a very learned discussion of the theory of dust, smoke and fumes by the foremost English authority. Without a fundamental knowledge of this theory, the plant operator is working more or less blindly. Therefore, do not let such terms as "aerosols" scare you from reading this article.—The Editors.

Adsorption of Gases

The adsorption of gases is another notable characteristic of aerosols. Every freshly broken surface of any size becomes immediately coated with a layer of adsorbed gas. With the great surface exposed by aerosols this adsorption becomes very great. Beyersdorfer ground 200 grams of lump sugar for 24 hr. in an air tight ball mill and found the pressure of air in the mill was reduced from 760 mm. to 23 mm. owing to the amount of air adsorbed on the freshly formed surfaces. The adsorption of gases by aerosols does not depend on the structure of the particles, as in the case of adsorption by charcoal, but may be considered as taking place on the convex surfaces of the particles. The adsorptive power is reinforced when the particles come together in a heap or form loose clots.

Particles covered with adsorbed gas cannot come in close enough contact to form flocs and it is very difficult to wet them, as by a water spray. (Everyone knows how hard it is to wet soot, for example.) But the adsorbed gas may be displaced by the introduction of a vapor (e.g., water vapor) or by giving the particles opposite electrical charges so that they attract one another.

Aerosols may be formed by grinding solids as in a tube mill, or by the condensation of a gas or vapor. The products of grinding generally form dusts, although the finer particles may form clouds. The condensation products are of much smaller particles and form fumes and smokes. Any one may see these form by holding an open ammonia bottle near hydrochloric acid or by dropping wax on a hot stove.

Electrical Characteristics

Electrical capacity is proportional to the exposed surface, since electrical charges reside on the surface. Rudge suggests that dust particles become charged by contact with one another. He found that:

(a) When dust is blown about by the wind it becomes charged, the sign and quantity of the charge depending upon the nature of the dust and the electrical condition of the atmosphere. The air (or perhaps the extremely fine particles that may be present in the air) becomes oppositely charged.

Rudge investigated 186 dusts by raising a cloud of dust in a brass tube in such a way that the dust was blown against a wire basket. He was able to collect the static electricity by the basket and determine its quantity and sign. He concluded that:

1. Nearly all kinds of dusts blown into a cloud by a current of air give rise to electrical charges upon the dust and upon the air.
2. The nature of the charge on the dust particles depends upon their chemical characteristics.
3. In general, the charge obtained upon the dust is opposite to the charge associated with the ion of the same substance when in solution. Strongly basic substances (e. g., limestones) give negatively charged dusts and strongly acidic substances (e. g., silica) give positively charged dusts.
4. In the case of salts the charge apparently depends upon the relative strength of the acidic and basic ions.
5. Similarly constituted substances give similar charges.

The following substances acquire a positive charge: carbon, copper chloride, potassium nitrate, sand, sodium chloride, fine soil, starch, sulphur.

The following acquire a negative charge: aluminum, aluminum oxide, dextrin, dextrose, flour, iron, iron oxide, lycopodium, magnesium, magnesium oxide, sodium carbonate, zinc, zinc carbonate, zinc oxide.

When liquid splashes or is atomized the drops acquire positive charges and the air negative charges. Lightning results from the cumulative effect of such charges.

(b) Dust becomes charged by friction on a solid surface. In this way electricity is developed in tube mills and other grinders. The dust escaping from the machine is charged and the mill will be charged if it is not grounded. Cohen has shown that: The charge that is acquired depends upon the relative dielectric constants of the dust and the material against which it rubs, the material possessing the higher dielectric constant becoming positively charged. This is known as Cohen's law.

The apparatus for studying Cohen's law, shown in Fig. 1, consists of a glass bottle (1) filled with powdered sugar connected by the tube (2) with the suction flask (3). A cylindrical electrode (4) in the flask receives the blast of dust and is connected with an electroscope (5). The sugar is blown over by a blast of dry air (2 atm.) and becomes negatively charged. The tube (2) is positively charged according to Cohen's law, the dielectric constants of sugar and glass being respectively 3.32 and 6-10. Using an insulated copper flask and tube the sugar became positively charged and the copper negatively charged. The copper flask became so strongly charged that a spark 1 cm. long could be drawn from it, corresponding to a potential of 25,000 volts.

Electrical charges accumulating in this way may be a source of real danger in industries in which explosive dusts are made.

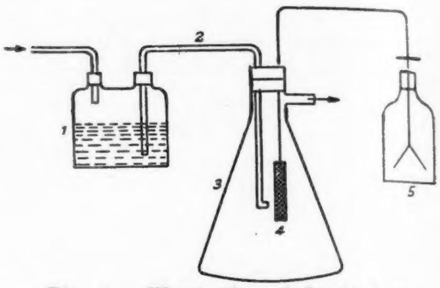


Fig. 1.—Illustrating Cohen's law

They may be prevented by grounding mills and bag filters, humidifying the air and introducing grounded collecters to drain off the charges.

An effect of these electrical charges on aerosols is to render them more stable since the particles repel one another. This prevents them from gathering into flocs. But such aerosols may be flocculated by gaseous ions or by introducing dust particles with the opposite sign.

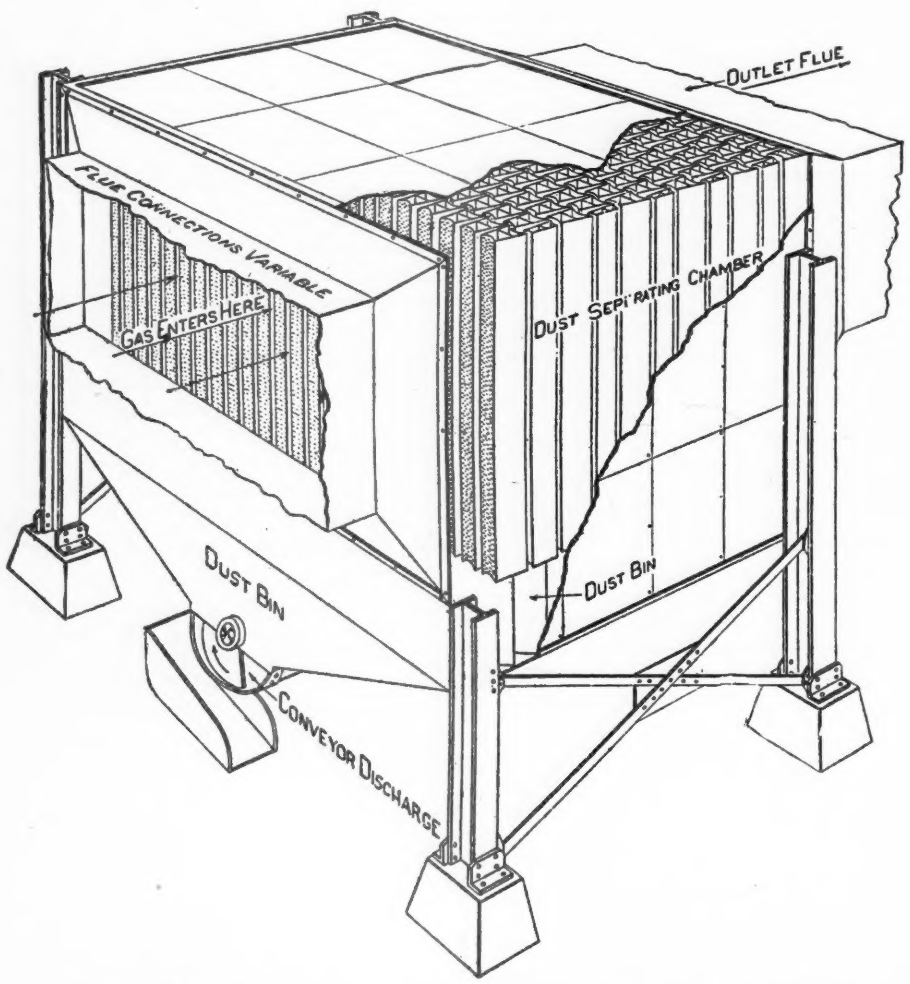


Fig. 2.—General view of a commercial mechanical dust collector or filter

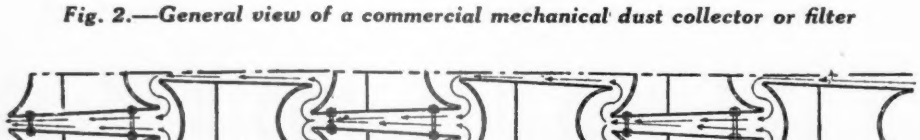


Fig. 3.—Diagrammatic plan view of the movement of dust-laden air or gas through the machine

Dust Explosions

The chemical activity of an aerosol has been shown to be due to the enormous surface exposed which brings many more molecules to the surface than in an ordinary solid. The effect is shown in explosions of coal dust and other combustible dusts like flour and starch. The dusts burn with the violence of a gas-air mixture.

The intensity of the explosion increases with the *dispersion* of the dust. It is diminished by the presence of moisture or dust of inert materials. It also increases with the concentration of the dust up to about the combining proportions of the dust and the oxygen of the air. Beyond an upper and lower limit of concentration *the dust will not ignite at all.* There is also a variation due to the oxygen content of the air.

In some cases combustion is hastened by adsorbed oxygen on the particles.

Life of Aerosols

When an aerosol is first formed the degree of dispersion is high and the collision frequency of the particles is at a maximum. This is further increased in many cases by the high temperature of the system just after dispersal. These causes induce rapid floculation in the primary stage.

The floculation causes the secondary degree of dispersion to rapidly displace the primary degree. The stability of the system increases since as the particles become larger and farther apart their movement is more sluggish. Ultimately they reach a state of equilibrium in which floculation takes place slowly or not at all. Further floculation will then depend on outside agencies. Whitelaw-Gray found the primary floculation stage lasted 5 hr., with zinc oxide smoke, the stable period lasted at least 24 hr., and that these two stages overlapped to produce an intermediate stage in which both floculation and settling operated.

Floculation may be set up by anything that

will displace the electric charge or the film of adsorbed gas on the surface. This may be done by charging the aerosol electrically. An electric charge opposes the effect of surface tension and may diminish the gas film sufficiently for actual contact between the particles to occur. A recent example of treating aerosols by electric charges is found in the dispersion of fogs by aeroplanes which scatter charged sand over them.

Treatment of Dusts in Industry by Settling

The rate at which spherical particles of unit density settle in still air is given in the following table:

Dia. of Particle in cm.	Rate of Settling cm./sec.	meters/hr.
0.01	30.0	1080.0
0.001	0.3	10.8
0.0001	0.003	10.8 cm.
0.00001	0.0003	1.8 mm.

The rates show the difficulty of settling particles smaller than 0.001 cm. diameter (about 1/250 in.) and it is practically impossible to hold large volumes of air still enough for settling.

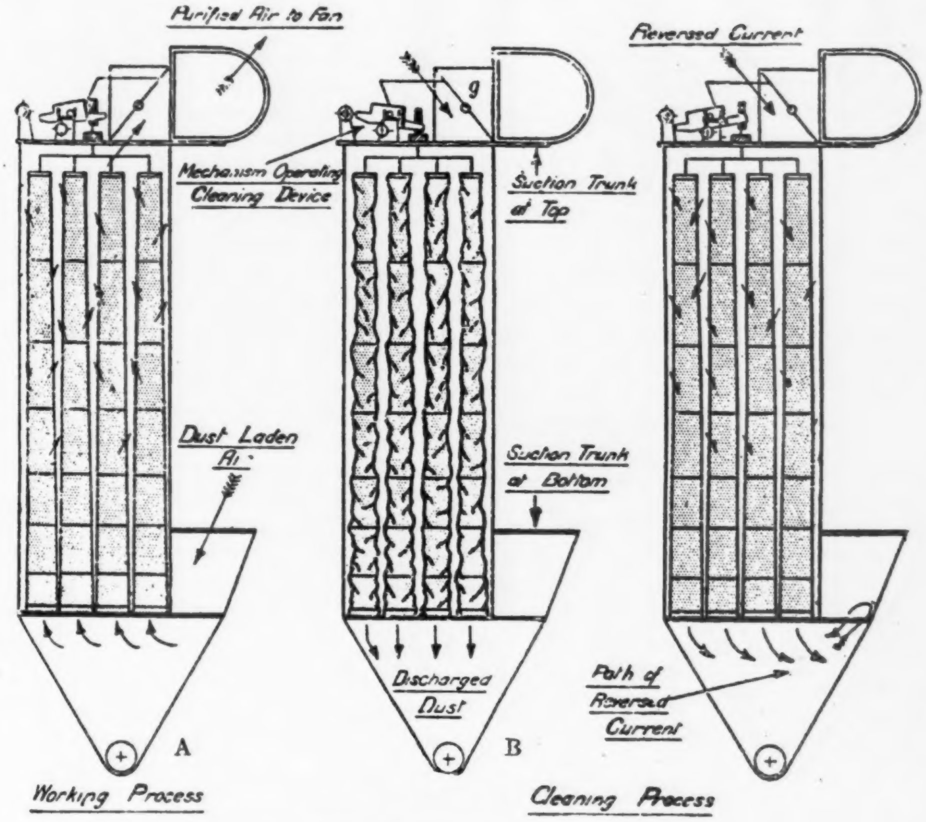


Fig. 4.—Details of a common bag type filter

Settling may be helped by centrifugal action by causing it to swirl in a conical collector, as in the ordinary "cyclone" collector. Another advantage of this machine is that it helps the dust to form flocs by forcing the particles into contact with each other and the sides of the vessel.

In many cases attempts are made to weight the particles with water, either by cooling the gas below its dew point or by introducing atomized water to cool the flues and moisten the particles. Such efforts are not usually successful, as not many particles come in contact with water drops and the particles are difficult to wet if they do.

The Traylor reverse nozzle dry dust collector shown in the cut collects dust by settling. The dusty gas passes through tapering passages and on emerging strikes against curved, perforated plates arranged so that the direction of the gas is reversed. The particles are thrown through perforations in the plates and settle in the still air chambers beyond.

Filtration

Many systems of filtration are used the best known being the bag filter. This consists of a series of vertical tubes of cotton or woolen cloth through which the air containing dust or fume is forced. The particles are deposited on the cloth fibers by the centrifugal action that is set up as the gas

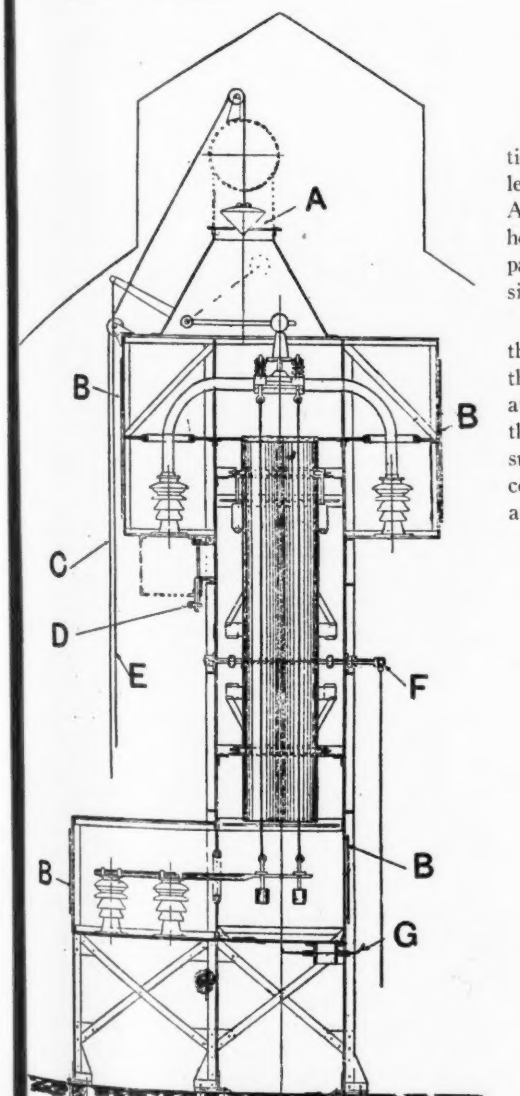


Fig. 5.—Pipe type electrical dust precipitator

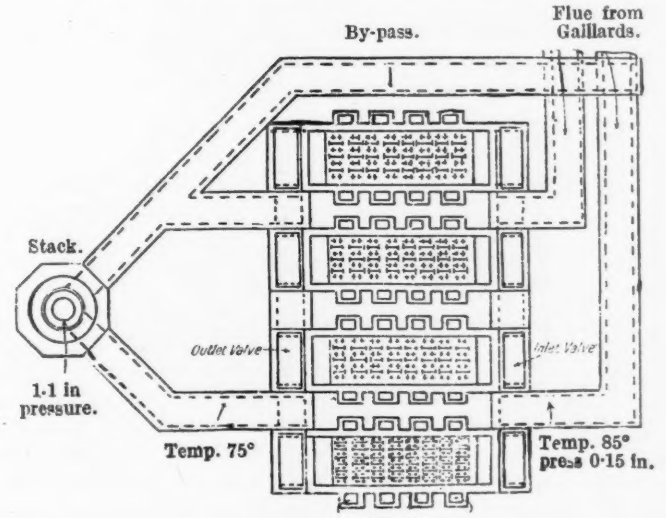


Fig. 6.—Plan of a plate type electrical dust precipitator

approaches or passes through the cloth. Coarser particles lodge in the interstices and increase the area of depositing surface. In the type shown, the bags are cleaned by reversing the current so that the bag partially collapses and the dust is dislodged and falls into the hopper. This takes only a few seconds.

Filter mats made of metallic or vegetable fibres felted together have been used to remove the coarser particles from suspensions.

In some forms wires or metallic fibers are coated with oil which increases their filtering efficiency.

Filters have been tried in which the suspension of dust was passed through some granular material such as fine sand.

Electrostatic Precipitation

When a highly charged wire is fixed opposite to a plate at some distance from it the intervening air becomes highly charged with electricity of the same sign as that of the wire. The intensity of the field varies inversely as the square of the distance from the wire. Of the gas ions or charged particles present in the air space some will be attracted to the wire. As they approach the wire their velocity will increase with the increasing strength of the field, and if the voltage be high enough the velocity will be so great that they will ionize the intervening gas and the wire itself by the force of their collision with the molecules of the gas (or air) and the wire.

Generally the wire is negatively charged so that it is the positively charged ions originally present in the gas that produce this ionization by collision. The negative ions so formed are repelled by the wire and travel rapidly toward the plate. The suspended particles are also driven mechanically by the rush of ions from the wire to the plate.

The essential unit of the Lodge-Cottrell (as it is known in England) precipitator consists of a wire passing down the center of a long metal pipe. The wire is charged negatively and the pipe is grounded and the gas and dust mixture (aerosol) passes through the pipe. There are a number of these pipes set in parallel. The dust is deposited upon the walls of the pipe and can be removed from time to time by tapping.

In the plate type flat plates take the place of the pipes and rods of a star-shaped section opposite the plates are used instead of wires.

A Recently Built French Cement Plant

ONE of the most recently built French cement plants is described in the July issue of *Revue des Materiaux de Construction* by *"M. B. Ingenieur."* It is a small plant according to American ideas, as its production is only 100 metric tons per day (about 600 bbl.). But it has been very carefully designed and constructed and represents modern practice in every way. It was built by the lime and cement company of Lavagiere and Lexos, which also produces hydraulic lime from three plants near Albi. The portland cement plant described is also near Albi. What follows has been abstracted from the article referred to. Some of the metric measurements have not been converted, as it is judged that most readers who would be interested are sufficiently familiar with the metric system.

The quarry face is 300 m. long and 25 m. high. Shale is found under the limestone and the quarry is worked in two benches for the two products. Both are sent to the plant by a monorail system, with 700-kg. cars, which has rope traction. This climbs a rather steep hill on its way to the plant.

The primary crusher is a gyratory taking 47 hp., which breaks everything to 6 to 8 cm. (about 3 in). This is followed by a set of rolls which reduces it to 2 cm. (about ¾ in.). The broken rock goes to silos, from which it is fed to the tube mill with water. A simple (undescribed) arrangement permits of proportioning the limestone and shale.

The tube mill has three compartments, the first with steel linings and balls, the second with silex lining and pebbles, and the third with steel lining and "cylpebs." The length of the mill is 8.40 m. (27½ ft.) and its diameter 1.6 m. (5¼ ft.), and it takes 140 hp. The slurry discharged contains 40% water.

The slurry is pumped from a reservoir to three correction tanks, each holding 120 cu. m. From this it is sent to storage tanks of 250 cu. m. capacity, each of which holds 1½ days' run.

Coal comes from the mines at Albi, sized from 25 mm. (1 in.) down. It is elevated to a 30-ton bin, which holds enough for a day's run. Additional storage for 400 tons is provided. The coal contains 25% volatiles and 13% ash.

The coal dryer is 14 m. long (46 ft.) and 1.4 m. (4¾ ft.) in diameter. It runs at 4 r.p.m. The hot gases are circulated through the dryer and between the dryer and the masonry work around it. A part of the hot gases is continually removed to take out the moisture. The dryer has helicoidal sections to urge the coal forward. Fifteen kilograms of coal are required to dry a ton, which is considered too high. The stack gas temperature is recorded by a pyrometer.

The dried coal is ground in a 3-compartment mill 7.2 m. (23½ ft.) long and 1.4 m. (4¾ ft.) diameter. Balls, "biscayens" and "cylpebs" are used in the different compartments. The power consumed is 90 hp.

The single kiln at present employed is 50 m. (163 ft.) long and 2.6 m. (8½ ft.) and 2.3 m. (7½ ft.) in diameter. The bearings of the trunnions that support the kiln are water cooled. In the last 15 m. of the kiln are paddles which break up the lumps of slurry as it dries. A pyrometer registers the heat in the stack gases.

The kiln has two speeds, 30 and 60 revolutions per hour, and it is run by a 36-hp. motor.

The firing of the powdered coal is by means of a fan which draws in air coming from the cooling of the clinker. The fan is water cooled and consumes 15 hp.

The clinker cooler is 16 m. long (52½ ft.) and 1.8 m. diameter (about 6 ft.). It is fitted with lifters to turn the clinker.

The clinker is elevated to storage and fed from storage to the finish grind mill. This is a 3-compartment mill of the same type as that used for the raw-grind. A second tube mill of a different type is held in reserve. The finished cement goes to four reinforced concrete silos each of which holds 500 metric tons (about 3000 bbl.).

A diesel oil engine of 750 hp. furnishes power for the plant.

Steel and reinforced concrete has been used throughout in the construction.

Arrangements are made so that by the addition of a second kiln the capacity of the plant may be doubled.

The composition of the cement made at this plant is given as:

Loss by ignition	2.40%
Silica	20.80%
Sesquioxide of iron	3.00%
Alumina	7.50%
Lime (CaO)	62.80%
Magnesia (MgO)	1.90%
Sulphuric Anhydride (SO_3)	1.30%
Loss	.30%
	100.00%

The hydraulic index is 2.06.

The sulphuric anhydride present, according to the article, does not come from the addition of gypsum but is produced in burning from the sulphur content of the coal. The regularity of setting of the cement is assured by sprinkling the clinker as it comes from the cooler.

Effect of Set on Cement Strength

AN interesting bulletin has just been issued by the Maine Technology Experiment Station which gives results of a study recently carried on to determine whether cement ingredients hastening or retarding the times of initial set have any effect on the strength of the cement at the test periods. This bulletin No. 16 is known as "The Time of Set as a Factory in Determining the Strength of Portland Cement," and is the work of G. W. Gowen, H. W. Leavitt and W. S. Evans.

Erratum

IN the article on the new packing plant of the Lawrence Portland Cement Co. on p. 53 of the September 4 issue of ROCK PRODUCTS, referring to the Pennsylvania air compressors used for the Fuller-Kinyon pumps the size given was 12x18-in. at 175 r.p.m. This should have read 12x10-in. running at 275 r.p.m.

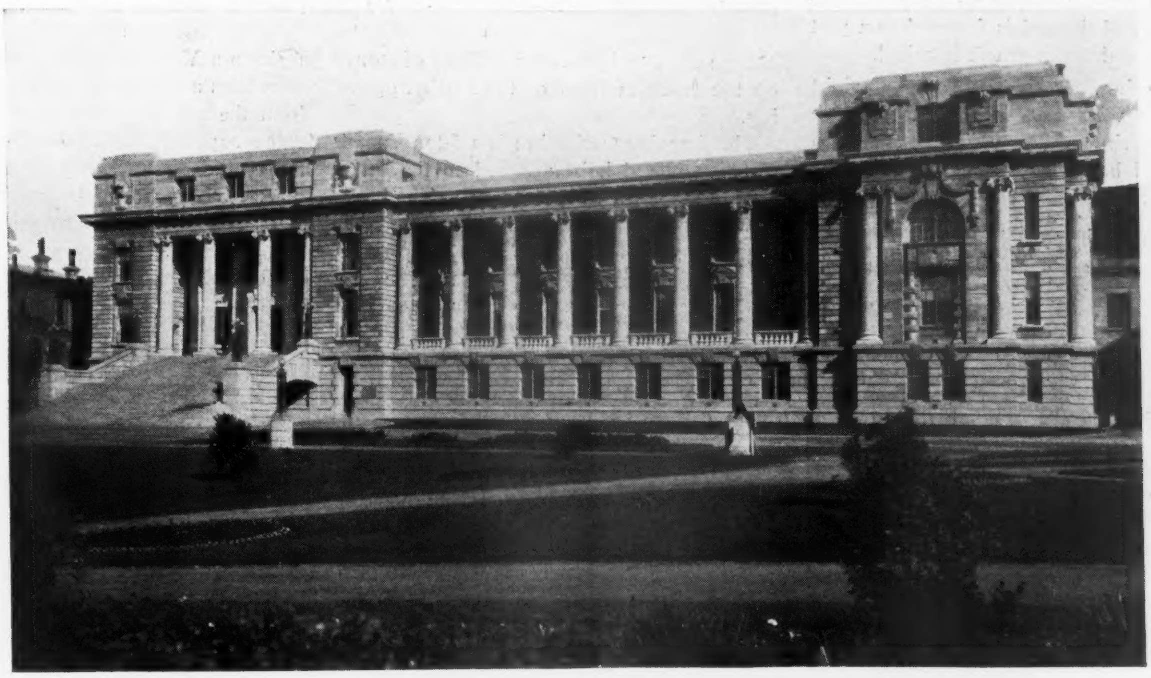
Rock Products Industry of New Zealand

Written for "Rock Products" by Capt.
J. C. McGill-Nutt, Wellington, N. Z.

THE ROCK FORMATION of the two large islands forming the main terrain of New Zealand covers an area of 105,000 square miles, or equal to the states of New York and Pennsylvania combined, and affords much interesting speculation for the geologist and physiographist. But the unusual depth and extent of the "building stone" sedimentaries affords exceptional interest to the commercial mineralogist and quarryman, and the trade possibilities have hardly yet been realized even among local commercial circles.

From the Archaen schists and granites of the Southern Fjiords to the recent sulphur beds of the Thermal regions near Rotorua, practically every form and quality of building stone is met with, and in such quanities as to make its commercial exploitation purely a question of marketing. Some of the red and blue granites of Fjiordland take a wonderful polish and will some day be among the most highly prized of ornamental stones procurable, while the green nephrite or "greenstone" of the Maoris is already valued by lapidaries as a jewel stone. This occurs in sufficient quantities to warrant commercial exploitation both as ornamental jewelry and for special facade work in buildings.

The greatest extent of useful building stones is found in the extensive deposits of marbles in the Nelson district and the limestones of Whangarei, while the almost unlimited deposits of sandstone called Oamarustone, near the town of that name, will provide an excellent building stone for centuries yet to come. In the Rotorua district extensive gypsum, alum and sulphur deposits give promise of interesting developments later when the local demand is sufficient to warrant their working.



Nelson marble is used in construction of new Parliament buildings at Wellington, N. Z.

The limestone deposits of Whangarei are the largest of their kind in the the world, and the quality is of a higher grade than is found elsewhere. Immense quantities of cement material exist in company with the limestone deposits, and the output of the only big cement company operating in the country exceeds a quarter of a million tons annually. The rapid growth of concrete work in New Zealand bids fair to absorb more than the present supply and with the growth of construction work now predicted the demand for cement and limestone products will greatly increase. Cement stone in sight at Whangarei alone is incalculable—one mountain of it is estimated to contain not less than 400,000 cubic tons and this is but a speck in the vast natural stone in the locality. The local consumption of cement per head of population is 2½ bags but this ratio will be more than trebled in the near future.

The Oamarustone deposits in Otago are very extensive, and vast quantities of an excellent building stone are still to be quarried from the stone in sight or proved. This stone makes a high grade building stone on account of its peculiar weathering qualities, chief of which is its hardening under the action of water, and thus improving with age. The nature of the deposition of Oamarustone is interesting and affords the quarries a very simple and effective means of quarrying the blocks in handy sizes for ordinary building purposes. Many of the larger goverment and public buildings have been built of this stone and their wearing qualities are very highly spoken of by the contractors.

The large marble quarries of the Nelson district have as yet only been scratched, but many thousands of tons of an excellent building stone have been taken out. This stone is a grey-veined rock which takes a high polish, and it was finally selected for use in the reconstruction of the parliament buildings at Wellington, the capital.

Rock products in New Zealand cover a wide range of utilities, and although the various industries depending upon rocks for their development, are still in their infancy their development on a large scale is simply a matter of marketing and general demand. Building blocks, tiles, cement blocks, fencing posts, gate posts, telegraph posts, power poles, sinks, wash tubs, dairy vats, boilers, and a wide range of fire-resisting articles each have special and separate manufacturies and their number is steadily growing—the latest being an insulator manufactory.

Hints and Helps for Superintendents

Quarry-Car Dumper

THE views herewith show a quarry-car dumper devised by J. H. Cooke, president of the Lynn Sand and Stone Co., Swampscott, Mass. The dumper has the advantage that the hook which tips the one-way dump-car bodies is self-engaging and self-disengaging. Hence the crusher tender has only to pull the switch cord of the hoist, and does not have to lay a hand on the car or the hook.

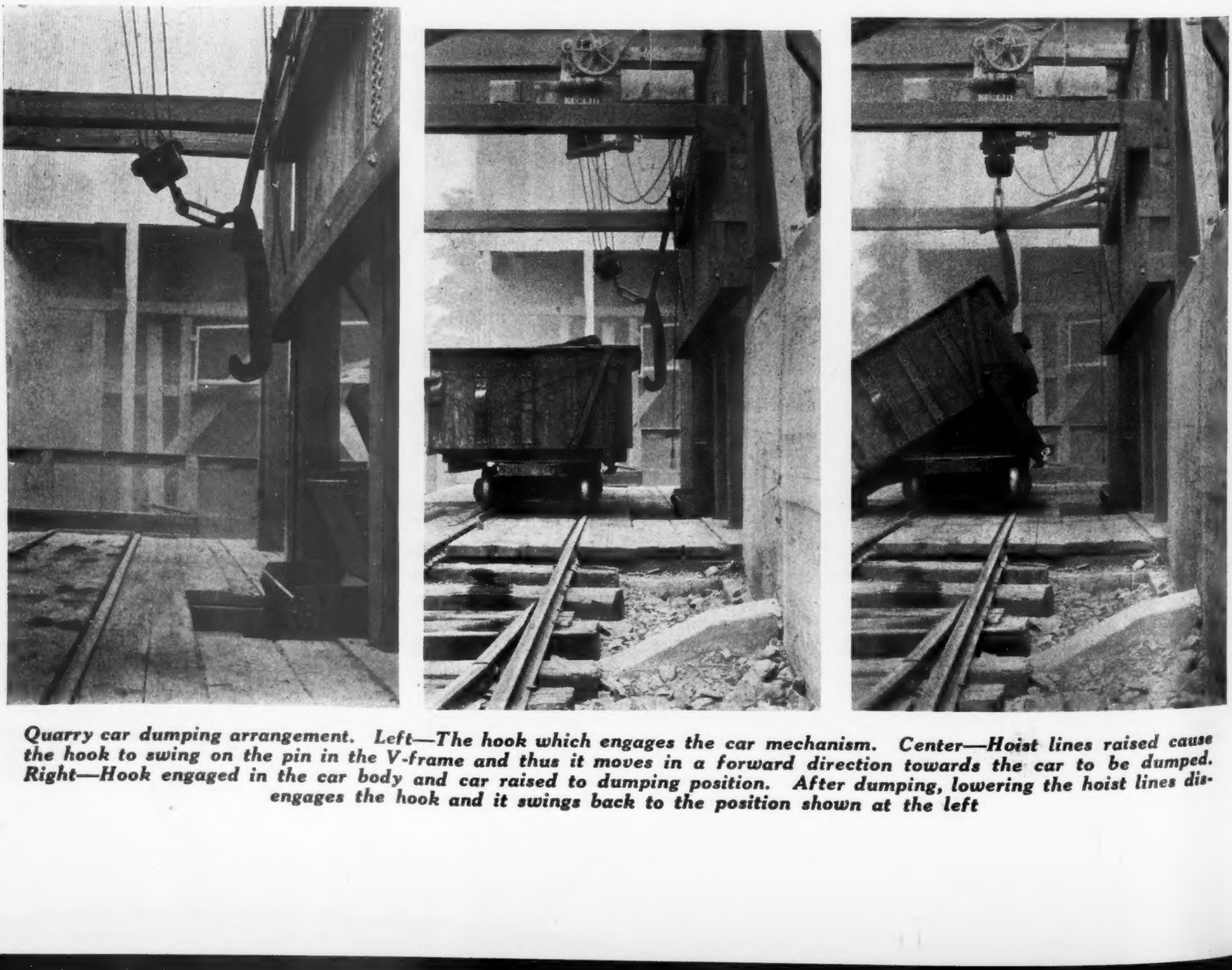
The larger view shows the details of the car itself, which is so built that raising the one side lets down the other side door, until it is level and parallel with the floor of the car. The door is hinged at the bottom, as shown in the view, and is held in place by wire ropes which pass under fixed pulleys on the ends of the car. The wire ropes then extend over pulleys at the tops of bars pivoted to the car bodies at the other side of the car, and the end is fastened to a part of the car on this side which is raised.

Rear of quarry car showing wire rope and fixed pulley arrangement. When one side is raised the other side door is let down until it is level with the floor of the car

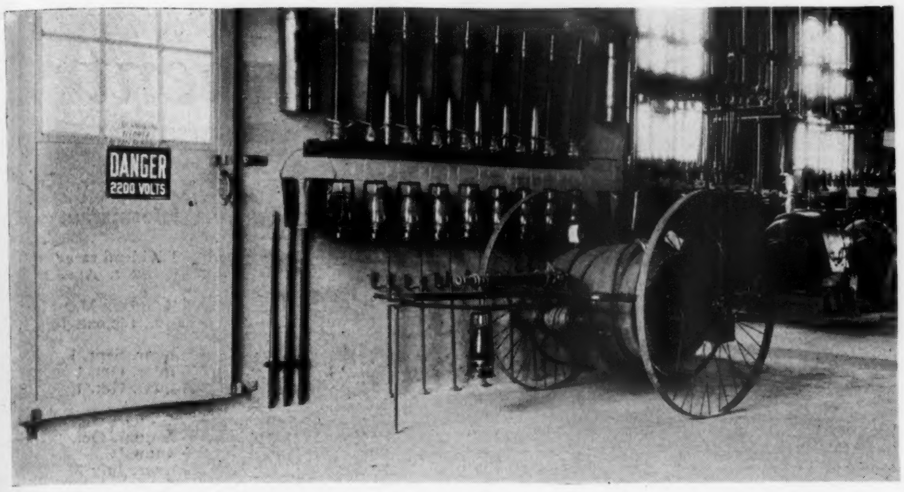
In dumping, as the cut on the right shows, the wire rope is slacked off, due to the lowering of the pulley attached to the pivoted bar. This slackening is just sufficient to straighten out the side that opens, so that it forms an extension of the car floor and prevents spillage of stone on the track in front of the crusher opening.

The dumping mechanism is a 5-ton Euclid electric-motored hoist attached to the traveler of a 20-ton Armstrong crane. The hook which engages the car body is attached by a pin to a V-frame, so that the moment the hoist lines are slacked, the hook clears itself from the car body and hangs close to the crane supports, as illustrated in the left and center views.

W. D. Manchester is superintendent and P. C. Cooke, quarry superintendent.



Quarry car dumping arrangement. Left—The hook which engages the car mechanism. Center—Hoist lines raised cause the hook to swing on the pin in the V-frame and thus it moves in a forward direction towards the car to be dumped. Right—Hook engaged in the car body and car raised to dumping position. After dumping, lowering the hoist lines disengages the hook and it swings back to the position shown at the left

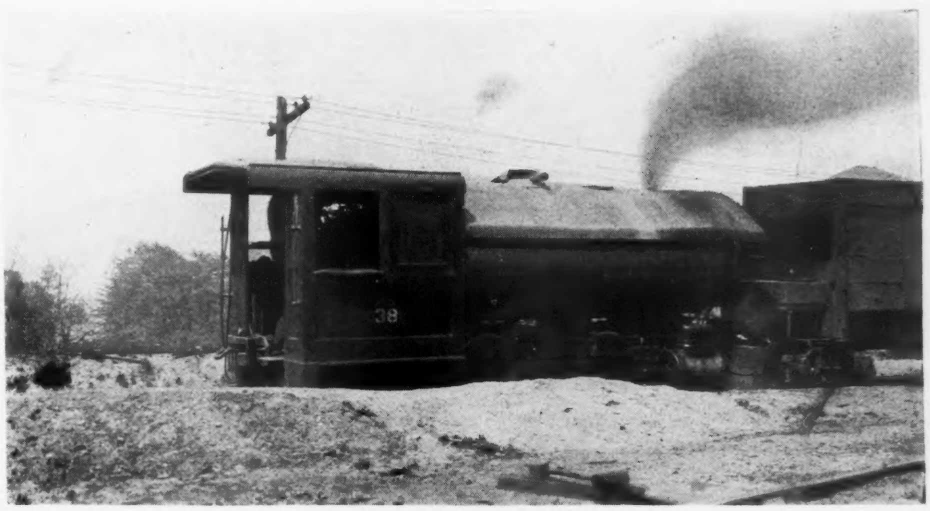


In spite of fireproof construction and other precautions, cement company has well equipped fire department

Protecting Locomotive Boiler from Corrosion

SEVERAL sand and gravel producers near large sea-coast cities dredge their material in salt water and wash it with salt water. The corrosive action of salt water on iron and steel are well known.

At the Port Washington, Long Island, plant of the Goodwin-Gallagher Sand and Gravel Co., New York City, salt water dripping from the sand and gravel bins was particularly destructive to the locomotive boilers. Therefore, after much experimenting, monel metal umbrellas were devised and they serve the purpose admirably of prolonging the life of the boilers. R. G. Waller is superintendent, and he testifies to the efficacy of this protection with rust-proof metal, which has been used some time.

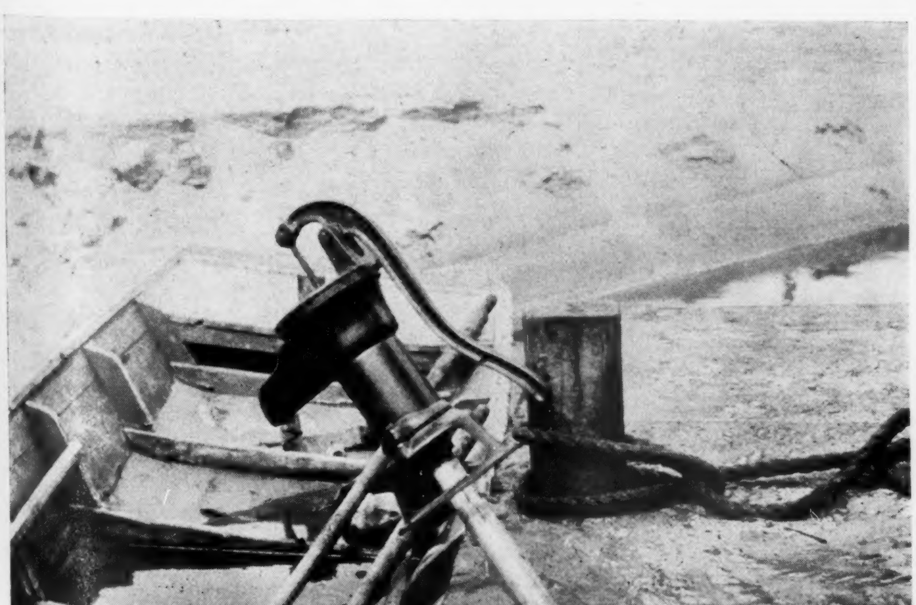


Locomotive at sand and gravel plant protected from salt water drippings by an "umbrella" of rust-proof metal

Plant Fire Departments

WHILE there may be mighty little to burn around modern rock products plants, probably insurance rates can be materially reduced by adequate plant fire-fighting facilities. The view herewith shows the "fire department" apparatus of the new Sandt's Eddy (Penn.) mill of the Lehigh Portland Cement Co. There practically is nothing to burn at this plant, it would seem, but it has a well-organized fire department and network of high-pressure fire lines and hydrants.

Such fire-fighting equipment, according to the experience of the editors, is comparatively rare in the rock products industries, but it would seem to be a good investment, especially as so many of these plants are in isolated localities, outside the zone served by municipal fire departments, for there is some combustible material always present.



Ordinary kitchen pump proves efficient in keeping dredge hull free from water, and takes little space when not in use

A Simple Means of Bailing a Dredge Hull

THE keeping of a dredge hull in condition depends largely on keeping the interior dry. Water gets into the hull both by leakage and condensation. A simple way of removing it is therefore a necessity. Larger dredges carry a power driven bilge pump but smaller ones depend on steam siphons (where steam is available) and various forms of hand pumps.

One of the simplest arrangements among those which have come to the notice of this department is shown in the accompanying picture. It consists of an ordinary kitchen pump and a piece of pipe for a suction. When bailing is needed this pipe is stuck through a hole in the deck and the pump is worked by hand. This type of pump has good capacity for its size and is amply efficient for many dredges.

That the pump is shown in the picture ready to deliver the water into a boat alongside the dredge hull is merely an accident in photography, or rather an oversight on the part of the photographer.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)[2] new stock	Oct. 25	No par	40	43	1½% quar. Apr. 3
Alpha Portland Cement Co. (preferred)[2]	Oct. 25	100	115	....	1¾% quar. Mar. 1
Arundel Corporation (sand and gravel—new stock)	Oct. 26	No par	33	33	45c qu., 15c ext. July 1
Atlantic Gypsum Products Corp. (1st 6's carrying 10 sh. com.)[10]	Oct. 27	....	108	113	
Atlas Portland Cement Co. (common)[2]	Oct. 25	No par	40	44	50c quar. Sept. 1
Atlas Portland Cement Co. (preferred)	....	100	....	....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)[2]	Oct. 25	33⅓	43	46	2% quar. Oct. 1
Beaver Portland Cement Co. (1st Mort. 7's)[8]	July 29	100	100	100	
Bessemer Limestone and Cement Co. (common)[4]	Oct. 25	100	133	140	1½% quar. Oct. 1
Bessemer Limestone and Cement Co. (preferred)[4]	Oct. 25	100	106½	108½	1¾% quar. Oct. 1
Bessemer Limestone and Cement Co. (convertible 8% notes)[4]	Oct. 25	100	99	100	8% annual
Boston Sand and Gravel Co. (common)[10]	Oct. 22	100	70	....	2% quar. July 1
Boston Sand and Gravel Co. (preferred)[10]	Oct. 23	....	90	95	1¾% quar. July 1
Boston Sand and Gravel Co. (1st preferred)[10]	Oct. 23	....	90	95	2% quar. July 1
Canada Cement Co., Ltd. (common)	Oct. 26	100	108	109	1½% quar. Oct. 16
Canada Cement Co., Ltd. (preferred)[11]	Oct. 22	100	117	....	1¾% quar. Nov. 16
Canada Cement Co., Ltd. (1st 6's, 1929)[11]	Oct. 22	....	101	102½	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11]	Oct. 22	100	93	96	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Oct. 25	No par	23	25	50c quar. July 12
Charles Warner Co. (preferred)	Oct. 25	100	101	103	1¾% quar. July 22
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929[16]	Oct. 22	100	102½	103½	
Cleveland Stone Co. (new stock)	Oct. 26	....	60	66	$1.50 qu. Sept. 1
Connecticut Quarries Co. (1st Mortgage 7% bonds)[17]	Oct. 22	100	104	....	
Consolidated Cement Corp. (1st Mort., 6½s, series A)[24]	Oct. 27	....	97	99	
Consolidated Cement Corp. (5 yr. 6½% gold notes)[24]	Oct. 27	100	97	100	
Consumers Rock and Gravel Co. (1st Mort. 7s)[18]	Oct. 22	100	99	101½	
Dewey Portland Cement Co. (1st Mort. 6's)[30]	Oct. 27	100	....	99½	
Dolese and Shepard Co. (crushed stone)[7]	Oct. 26	50	88	91	$1.50 quar. Oct. 1
Egyptian Portland Cement Co. (7% pfd. with com. stock purchase warrants)[21]	Sept. 24	....	96	100	1¾% quar. Oct. 1
Egyptian Portland Cement Co. (common)[21]	Sept. 24	....	14	18	40c quar. Oct. 1
Egyptian Portland Cement Co. (warrants)[21]	Sept. 24	....	10	15	
Giant Portland Cement Co. (common)[2]	Oct. 25	50	55	60	
Giant Portland Cement Co. (preferred)[25]	Oct. 25	50	50	55	3½% s.-a. June 15
Ideal Cement Co. (common)	Oct. 26	No par	68	69	1¾% quar. July 1
Ideal Cement Co. (preferred)[6]	Oct. 11	100	106½	109½	$1 quar. July 1
International Cement Corporation (common)	Oct. 25	No par	47⅞	47⅞	$1 quar. Sept. 30
International Cement Corporation (preferred)[2]	Oct. 26	100	101⅞	101⅞	1¼% quar. Sept. 30
Kelley Island Lime and Transport Co.	Oct. 26	100	133	135	$2 quar. Oct. 1
Lawrence Portland Cement Co.[2]	Oct. 25	100	85	100	2% quar.
Lehigh Portland Cement Co.[6]	Oct. 25	50	88	90	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1927 to 1931)[13]	Oct. 23	100	99	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1931 to 1935)[13]	Oct. 23	100	97	98	
Marblehead Lime Co. (1st Mort. 7's)[14]	Oct. 23	100	104	106	
Marblehead Lime Co. (5½% notes)[14]	Oct. 23	100	99	100	
Michigan Limestone and Chemical Co. (common)[6]	Oct. 25	....	26	....	
Michigan Limestone and Chemical Co. (preferred)[6]	Oct. 25	....	24	26	1¾% quar. July 15
Missouri Portland Cement Co.	Oct. 26	25	55	56	50c Nov. 1
Monolith Portland Cement Co. (common)[9]	Oct. 21	....	11½	12	
Monolith Portland Cement Co. (units)[9]	Oct. 21	....	28	29½	
Monolith Portland Cement Co. (preferred)[9]	Oct. 21	....	8¼	8¾	
Nazareth Cement Co.[20]	Oct. 25	No par	39	41	75c quar. Apr. 1
Newaygo Portland Cement Co.[1]	Oct. 23	....	120	....	
New England Lime Co. (Series A, preferred)[14]	Oct. 23	100	92	95	
New England Lime Co. (Series B, preferred)[22]	Oct. 25	100	92	97	
New England Lime Co. (V.T.C.)[22]	Oct. 25	....	35	38	
New England Lime Co. (6s, 1935)[14]	Oct. 23	100	99	101	
North American Cement Corp. 6½s 1940 (with warrants)	Oct. 26	100	95¼	95⅜	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[19]	Aug. 14	....	94	99	2 mo. period at rate of 7%
North American Cement Corp. (common)[19]	Oct. 25	....	20	22	
North American Cement Corp. (preferred)	Dec. 31	....	....	....	1.75 quar. Nov. 1
North Shore Material Co. (1st Mort. 6's)[15]	Oct. 27	100	98½	100	
Pacific Portland Cement Co., Consolidated[5]	Oct. 23	100	60	61½	½% mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5]	Oct. 23	100	96¾	97	3% semi-annual Oct. 15
Peerless Portland Cement Co.[1]	Oct. 23	10	6¾	7¼	
Pennsylvania-Dixie Cement Corp. (1st Mort. 6's)[29]	Oct. 27	100	99¼	99⅝	
Pennsylvania-Dixie Cement Corp. (preferred)[28]	Oct. 27	100	98	99½	
Pennsylvania-Dixie Cement Corp. (common)[28]	Oct. 27	....	38	38½	
Petoskey Portland Cement Co.[1]	Oct. 26	10	9¼	9¾	1½% quar.
Pittsfield Lime and Stone Co. (2 sh. pfd. and 1 com.)[10]	Oct. 23	....	....	220	
Rockland and Rockport Lime Corp. (1st preferred)[10]	Oct. 23	100	105	....	3½% semi-annual Aug. 2
Rockland and Rockport Lime Corp. (2nd preferred)[10]	Sept. 11	100	....	....	3% semi-annual Aug. 2
Rockland and Rockport Lime Corp. (common)[10]	Oct. 23	No par	50	55	1½% quar. Nov. 2
Sandusky Cement Co. (common)[1]	Oct. 26	100	115	125	$2 quar. Oct. 1
Santa Cruz Portland Cement Co. (bonds)[5]	Oct. 23	....	105¾	....	6% annual
Santa Cruz Portland Cement Co. (common)[5]	Oct. 23	50	79	....	$1 quar. $1 ex. Dec. 24
Superior Portland Cement, Inc. (Class A)[20]	Oct. 22	....	43	43½	
Superior Portland Cement, Inc. (Class B)[20]	Oct. 22	....	20¾	21¼	
United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27]	Oct. 25	100	98	100	
United Fuel and Supply Co. (sand and gravel) 6% gold notes[27]	Oct. 25	100	99	101	
United States Gypsum Co. (common)	Oct. 26	20	138	138	2% quar., $1 ex. Sept. 1
United States Gypsum Co. (preferred)	Oct. 26	100	117	119	1¾% quar. Sept. 30
Universal Gypsum Co. (common)[3]	Oct. 26	No par	9¾	10½	
Universal Gypsum V.T.C.[3]	Oct. 27	No par	9½	10½	
Universal Gypsum Co. (preferred)[3]	Sept. 15	....	70	73	1¾% quar. Sept 15
Universal Gypsum and Lime Co. (1st 6's, 1946)[3]	Oct. 27	100	96	....	
Union Rock Co. (7% serial gold bonds)[18]	Oct. 22	100	99	101	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940)[15]	Oct. 27	100	98½	100	
Wolverine Portland Cement Co.	Oct. 26	10	6½	7	3% Nov. 15

[1]Quotations by Watling, Lerchen & Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee. Higginson & Co., Boston and Chicago. [11]Nesbitt, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson Jr. Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago.

Editorial Comment

Half a Loaf Better Than None?

A press dispatch released by the U. S. Bureau of Public Roads on October 23 is headed: "Saving of \$2,000,000 a year result of new paving facts." The text is a popular summary of the report of the recent experiments of the Bureau at Arlington on brick pavements, in which the thickness of the brick tested under service conditions varied from 2-in. to the present standard 4-in. paving brick thickness. In all respects except the thickness of the brick the pavement construction was identical; that is, they all had good 5- or 6-in. cement-concrete bases, although this is not mentioned in the aforesaid news release.

"The results of the test," says the dispatch, "definitely prove that 2½-in. brick of the quality used, when properly supported on a firm foundation, will prove satisfactory for pavements carrying the heaviest traffic; and 2-in. brick are shown to be entirely satisfactory for streets carrying the lighter types of traffic. It is expected that the use of 4-in. brick, the common practice for many years, will be practically abandoned as a result of the test, and that engineers, generally, will adopt the thinner types." The saving from thinner bricks, estimated at from 50 cents per sq. yd. down to 15 cents, supplies the data for the \$2,000,000 a year saving.

These tests are evidently being hailed by brick manufacturers as *favorable,* on the theory, we presume, that "half a loaf is better than none"; that reducing the cost of brick surfacing will make it easier to compete with concrete pavement without brick surfacing, even though all the saving is at the expense of the brick maker.

It may appear unkindly in us to detract from this crumb of comfort that brick manufacturers thus receive; but, on the other hand, we fear we would be delinquent in our duty to our industries who furnish materials for pavements in competition with brick, if we did not point out, what doubtless is apparent to many, the "joker" in these experiments and their results.

This joker is, as we see it, quite evident to most any unbiased student of pavements: If you can safely reduce the thickness of the paving brick to 2 or 2½ in., it really is but another link in the accumulating evidence that you can also eliminate the brick altogether, without serious result to the real pavement, which is the concrete base.

About the last sales argument left with which to promote the sale of paving brick is "a replaceable wearing surface"; but one seldom hears of a brick wearing surface replaced with another brick wearing surface. It is much more common practice to resurface the battered brick with an asphaltic wearing surface.

It is true that in some sections of the country the concrete aggregates locally available are soft enough to wear under tire-chain traffic in winter, but oddly enough most of the sections of the country where resistant concrete aggregates are scarce are also the sections of the country where there is very little winter and little need for tire chains.

We do not wish the paving brick interests any ill-will. We are only thankful that producers of rock products are not compelled to tie their business with such flimsy anchor lines.

Determination of Fineness

In the earlier days of cement making a 50-mesh sieve was considered good enough to test cement for fineness. Afterward the 100-mesh and finally the 200-mesh sieve came to be used. With the last the practical limit of sieving seemed to have been reached and the research men began to seek for apparatus that would determine fineness below the limits of sieving.

To supply this need the air analyzer was devised by Pearson and Sligh of the Bureau of Standards. It is a thoroughly practical machine although it is somewhat expensive and requires considerable time to make a complete determination. A somewhat cruder form of machine known as a "flourometer," which employs a current of air to separate the finer particles, is used both in Europe and America.

Of late, European investigators have been busy with the problem and two new methods which are quick and inexpensive have been brought out. One, a German method, employs the difference in settling rates of the sizes in alcohol and was briefly described on page 63 of the October 14 issue of ROCK PRODUCTS. The other, an optical method, has been worked out in the laboratory of G. and T. Earle, English cement makers. It depends upon the relative opacity of a sample of cement suspended in a standard viscous liquid and is said to be quick and accurate.

What is really wanted is the amount of surface exposed by the particles and a method of determining this for quartz was worked out by Dr. Martin of London, Eng., in connection with his well-known grinding experiments. It depends on the amount dissolved from the particles in a standard acid solution under uniform conditions, and while it would seem difficult to adapt the method to cement some investigator may find it possible.

Intensive research of cement manufacture is going on today and everyone recognizes that a method of determining the relative fineness of samples is necessary before such research can get very far. It is agreeable to record, therefore, that investigators are seeking for new and simpler methods, and it is to be expected that they will evolve one which may be universally adopted.

National Agstone Members Discuss Freight Rates and Sales Methods

Committee to Protest Changes in Rates—Sales Methods Successful in Wisconsin and Illinois

THE November meeting of the National Agstone Association was held in Chicago, Thursday, November 28, at the Congress hotel. Chicago had been chosen for a meeting place in order that the producers from Wisconsin, Illinois and Indiana might attend easily, but the notice was somewhat short and it is the busy season for the crushed stone industry so not many of these were present. However, the meeting was very interesting and it discussed two subjects always of interest to producers, freight rates and sales methods.

New Freight Rates Proposed

The railroads have proposed a new classification and a new rate on agricultural limestone and similar products and a meeting of the Central Freight Association is to be held in the Transportation building, Chicago, on November 9 to hear any protests that may be made. The National Agstone Association will send a committee to make a protest, appointed at Thursday's meeting, of which J. C. King is chairman and Harry Brandon and C. H. Ruedebusch are the other members. They will collect such data as they can in the short time available to show why no change in rates should be made at this time.

Harry Brandon (Ohio Marble Co., Piqua, Ohio) opened the discussion regarding rates by explaining the present classification of finely divided limestone materials into road stone, agricultural limestone, stone dust and pulverized limestone, all of which had different uses (although the commodity itself might be identical) and hence took different freight rates. Some producers had not played the game and had shipped (for example) asphalt filler as agricultural limestone. The railroads wanted to do away with a multiplicity of rates and the complications and unfair and even dishonest practice that grew out of it. In his opinion the railroads were not trying to increase rates so much as to clarify the situation and make rates logical. But they had proposed a new classification which was not altogether satisfactory. He was going home at once to make a survey of rates based on last year's experience and he advised other members to do the same. If they did not the railroads would make such a survey based on a short period which would not be representative of the year and might result in unfair conclusions.

Crushed Stone Rates Chaotic, Too

In his opinion the whole system of rates on agricultural lime was about to be revamped and as the crushed stone rates were in an equally chaotic condition, these rates would be revamped as well. Every proposal for changing rates made recently had been based on mileage rates. If this was not satisfactory to the members, they had better make the survey and be ready to oppose it with facts and figures.

Whenever the producers would go to the roads with a statement of the real levels of rates this would be the basis from which the roads would work, but this level must be established first.

It is understood from another source that the new classification and schedule is one that is based on giving a certain percentage of the sixth class rate to the following:

Limestone, unburned, ground and pulverized.

Agricultural limestone, agricultural limestone screenings.

Agricultural marl, limestone dust and filler.

Ground or pulverized limestone, sand or brick. Minimum weight 60,000 lb.

Shipments in box cars are those which will be mainly affected.

C. H. Ruedebusch of the Mayville Lime Co., Maysville, Wis., said that in Wisconsin they had a straight mileage basis which was very satisfactory. Producers were now mostly combined under the state co-operative law passed last year. No shipments were made out of the state. But he and his associates were interested, as it was understood that intrastate rates would be affected and they did not want the Wisconsin rates changed.

Mr. Brandon said that Indiana had some mileage rates on open top shipments which were considered satisfactory. He wanted to know how the mileage basis would operate in the case of a quarry not at the station or billing point. Mr. Ruedebusch answered that in their case they were three miles from the Mayville station and they billed from Mayville siding, where the plant was.

N. E. Kelb (France Stone Co., Greencastle, Ind., plant) gave a short history of how the Indiana rate came into effect. The railroads did not recognize a mileage basis as such (except for agricultural limestone), but did publish tariffs based on it. Shipments of agricultural limestone in open top cars take the crushed stone rate. He knew of no case in which road material had been shipped as agricultural limestone because the crushed stone rate was cheaper. Illinois has two scales; one is a long haul reduced rate voluntarily put in by the railroads to aid agriculture.

Sales Methods Discussed

Mr. Kelb, whose company ships a great deal of agricultural limestone to Illinois points, spoke of the arrangement by which the Illinois Agricultural Association worked with the producers. It has been found good for the farmers and good for the companies. Every farmer certified as a member of a farm bureau got a reduction of 10 cents a ton. There were two price plans, one which used a quarry price and the other a delivered price. The delivered price had been found more satisfactory, as the farm agent (or the farmer) did not have to be a freight rate expert to figure what the limestone would cost at his station. The tonnage being used was evidence that the whole Illinois plan had worked out well. Mr. Brandon interrupted at this point to say that he had just returned from a trip through Illinois and he saw more lime going on the fields than he saw in Ohio.

Continuing Mr. Kelb said that they had kept away from the question of sizes. The limestone sold was all ¼-in. down to dust (screenings) containing at least 90% total carbonates and both the farmer and producer were satisfied. In answer to a question he explained that the agricultural association was a union of farm bureaus. The state has nothing to do with it, the farm agents employed by the bureaus being paid partly by federal aid but mainly by the dues of farmer members.

Mr. Brandon said that such a scheme would not work in Ohio, where farm agents were paid by the federal government, the state and the county. It had been shown that dealers would oppose such a move by legal measures.

H. C. Krause (Columbia Quarries, St. Louis, Mo.) said the dealers should not kick. The association was building up a broad market for agricultural limestone and there were plenty of non-member farmers to whom they could sell. Mr. Krause later showed how association work had helped in Bond county. Bankers, merchants and others backed the

movement for agricultural limestone and raised the sales in the county from 7000 tons to 20,000 tons. The last was not a large amount; in some counties sales exceeded 35,000 tons.

Planning for National Crushed Stone Association Convention

President Poorman (France Stone Co., Toledo, Ohio) said that, in line with the talk on sales methods, he had received a letter from President Graves of the National Crushed Stone Association asking what the agstone association wanted on the National Crushed Stone convention program. It had been proposed that J. R. Bent of the Illinois Agricultural Association, who had been so active in furthering the use of lime in Illinois, be asked to speak both at the regular meetings and at the luncheon group of agricultural limestone producers. Several members expressed a wish to hear Mr. Bent and on motion it was voted to communicate with those who are preparing the convention program asking that Mr. Bent be invited to speak. Mr. Kelb pointed out that anything that helps the sale of agricultural limestone helps the crushed stone industry, as most of the crushed stone industry have the fine sizes of lime to dispose of. Mr. Brandon said hitherto too much stress had been laid on the rosy side of the business, the great need of agricultural liming material, and it would be pleasant to have someone speak of the practical methods used to place it in the hands of the farmers.

The Wisconsin Cooperative Sales Method

P. D. Southworth of the Wisconsin Cooperative Agstone Association was asked to tell how such an institution came into being and what it was doing. He said that it came about because some companies had so much business one year that they were forced to buy from their competitors and find out that competitors were also "white men." They wanted then to form a promotion agency and a central sales bureau and they were enabled to do that by the passage of a law which permitted the forming of cooperative associations for agricultural benefit. The institution had been called a "legalized trust" but it was strictly legal as the advice of the state's attorney had been followed exactly in organizing.

Sales were made through 450 dealers and the association had five men on the road. These sold the *idea* of liming to farmers and tested soils. The product was uniformly 90% to 95% through 10 mesh and kiln dried and shipments were made both sacked and loose in the car. A lower price for the summer months was made which helped to iron out the peaks and a cheaper material was put out to be sold only in the summer. Dealers were taking advantage of the low summer prices and putting up storage bins to hold limestone for the fall sales.

The cooperative issued a booklet (which was shown) and these were distributed by dealers and by banks. Advertising in agricultural papers and local weeklies was used with keyed ads so that the results could be measured. The cooperative worked closely with the state agricultural college and county agents.

They had studied the farmer's problems and had even gone out and made contracts for trucks to deliver limestone when the farmer was too busy to haul it himself. Sales expense was distributed on a per ton basis and it was considerably lower than it had been for individual companies.

Mr. Brandon spoke of his experience with direct mail in Ohio. He analyzed a list of 44,000 names which they had and found many of them had been merely a source of expense. So a new system of weeding out the unprofitable ones was introduced which brought the list down to 6500 live ones. With the smaller list direct advertising had paid much better than with the larger.

Effect of Summer Discounts

H. C. Krause told of his company's experience with a discount on sales made in the summer months. This has been very successful in flattening the peaks, as shown by the comparison of 1925 and 1926 sales, the percentage in agricultural limestone for each month being:

	1925	1926
January	3.3	4.8
February	4.0	6.7
March	4.2	5.4
April	3.0	5.0
May	1.9	10.6
June	1.2	14.9
July	6.1	10.0
August	41.0	16.1
September	34.0	15.9
October	9.0	8.0

After lunch the members were shown a new and very simple device for testing soils by L. M. Brown of the Albert Dickinson Co.

President Poorman expressed the thanks of the association to Rock Products for its active work in behalf of the agricultural limestone industry and for its excellent reports of meetings.

Those who were present:

L. E. Poorman (president of the association), N. E. Kelb and F. M. Dickey, France Stone Co., Toledo, Ohio.

F. J. Coglan, Coglan Limestone Products Co., Columbus, Ohio.

Harry Brandon, Ohio Marble Co., Piqua, Ohio.

H. C. Krause, Columbia Quarries Co., St. Louis, Mo.

Carl H. Ruedebusch and K. C. Ruedebusch, Mayville White Lime Co., Mayville, Ohio.

P. D. Southworth, Wisconsin Cooperative Agstone Association.

W. H. Margraf (secretary of the association), Marble Cliffs Quarries Co., Columbus, Ohio.

R. A. Coombs and L. M. Brown, Albert Dickinson Co., Chicago.

C. S. Darling, Pennsylvania Crusher Co., Chicago.

R. A. Goodwin, *Cement Mill and Quarry*, Chicago.

Edmund Shaw, Rock Products, Chicago.

Analysis of Hydrated Lime by a Thermochemical Method

IN the course of an investigation recently conducted at the bureau on the rate of carbonation of lime plaster it was found necessary to develop a method of analysis by which some information could be determined which was not given by the ordinary chemical analysis. It was desired, in order to compare intelligently magnesian and high calcium hydrated limes, to be able to determine the actual percentages of calcium oxide and magnesium oxide combined, either as carbonates or as hydroxides.

The method found most satisfactory is, in brief, as follows: A sample of the material in question, either hydrated lime, mortar, or similar material, is heated at succeeding temperatures for definite periods of time. The loss in weight is determined after each heating, and from the data thus obtained a curve is plotted, temperature against loss in weight. Definite breaks occur in this curve, indicating the dissociation of the magnesium hydroxide, calcium hydroxide and calcium carbonate, and from the curve the loss in weight due to the decomposition of each of these compounds individually may be obtained. From these data the percentages of the compounds may be readily calculated. It has not been found possible to differentiate magnesium carbonate from calcium hydroxide by this method, since the temperature range in which they decompose is too narrow. The method does, however, give good results for calcium hydroxide and magnesium hydroxide, and it is probable that when relatively small percentages of carbon dioxide are present this constituent occurs almost entirely as calcium carbonate.

A considerable number of samples of commercial magnesian hydrated limes have been investigated by this method. It was found, in general, that samples freshly made contained very little magnesium hydroxide, but that the calcium oxide content was practically completely combined. This may in part be due to the actual slowness of the hydration of the magnesia, and also to the practice commonly followed in hydrating quicklime, of adding only enough water to satisfy the chemical requirements of the calcium oxide, and entirely neglecting the magnesium oxide. Samples which had stood in the laboratory for some time were found to be considerably higher in magnesium hydroxide, showing that in time this does hydrate, and indicating that, perhaps, improved methods might be devised by which the magnesia might be more completely hydrated at the start.—*Technical News Bulletin* of the U. S. Bureau of Standards.

Portland Cement Output in September

Production and Shipments for Nine Months Exceed Last Year's Record—Stocks Still High

September production and shipments were the highest for that month in the history of the industry, according to the Bureau of Mines, Department of Commerce report. Statistics compiled show that about 16,571,000 bbl. were made. This is about 2% less than the preceding month but about 4% greater than September, 1925. Shipments declined about 3% from the last month and were 2% higher than the month of September, 1925. Stocks continued their decline but at the end of September were nearly 38% higher than on September 30, 1925. During the nine months ending September 30, 1926, the shipments of portland cement amounted to 126,467,000 bbl., exceeding the shipments for the corresponding period in 1925 by 2,156,000 bbl.

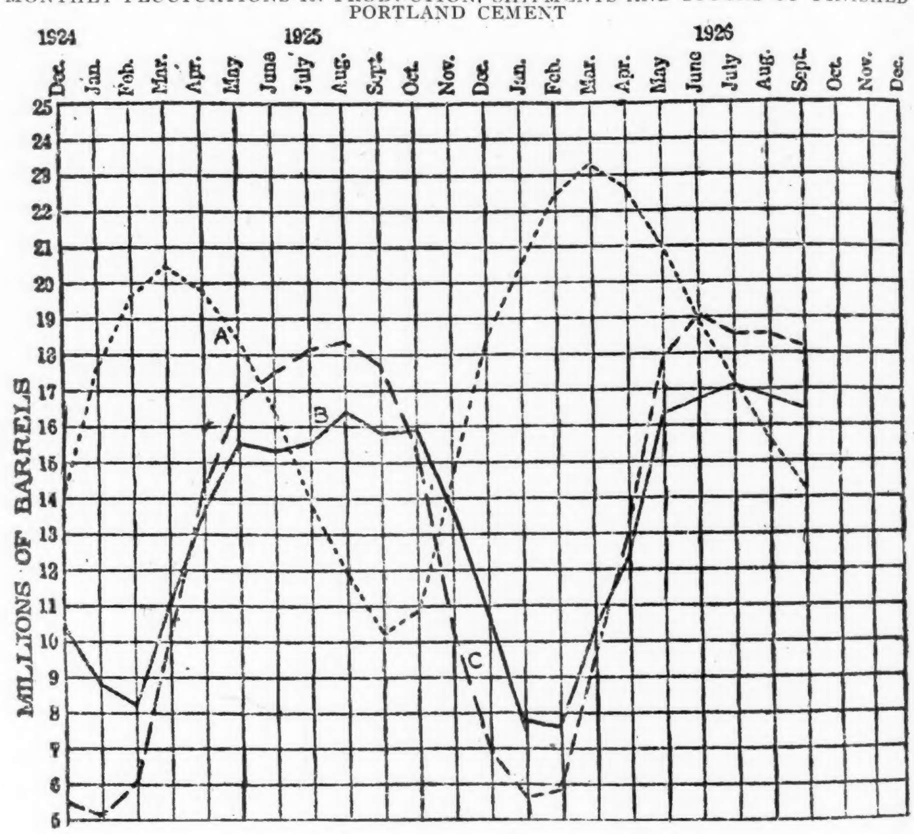
These statistics, prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines, are compiled from reports for September, 1926, received direct from all manufacturing plants except two, for which estimates were necessary on account of lack of returns. Revisions have been made on statistics for the last month wherever possible.

Clinker Stocks

Stocks of clinker, or unground cement, at the mills at the end of September, 1926, amounted to about 6,095,000 bbl. compared with 7,362,000 bbl. (revised) at the beginning of the month.

An estimate of the unground clinker by months is given in the second column of the succeeding page.

MONTHLY FLUCTUATIONS IN PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT



(A) Stocks of finished portland cement at factories. (B) Production of finished portland cement. (C) Shipments of finished portland cement from factories

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during the months of July and August, 1925 and 1926:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN JULY AND AUGUST, 1925 AND 1926, IN BARRELS*

Shipped to—	July 1925	July 1926	August 1925	August 1926
Alabama	256,741	184,577	277,605	173.619
Alaska	2,816	1,386	264	1.130
Arizona	37,842	35,817	33,328	45.553
Arkansas	78,059	73,292	88,143	71,312
California	1,061,048	1,173,099	1,154,523	1,165,387
Colorado	118,272	117,990	118,335	133,172
Connecticut	176,644	218,375	†194,911	224,946
Delaware	43,326	38,228	50,949	35,287
District of Columbia	82,133	94,852	83,155	75,684
Florida	341,849	284,281	310,457	330,285
Georgia	132,050	213,432	136,542	188,201
Hawaii	993	12,761	1,108	8,895
Idaho	28,498	47,991	31,846	44,589
Illinois	1,853,734	1,857,890	1,790,148	1,806,425
Indiana	658,042	696,653	690,624	694,894
Iowa	327,155	353,529	375,407	412,046
Kansas	226,787	230,022	254,074	260,169
Kentucky	229,652	198,902	220,859	174,283
Louisiana	99,111	112,958	105,440	121,260
Maine	41,475	67.475	†37,277	108,161
Maryland	247,835	221,600	235,983	208,790
Massachusetts	386,058	331,320	†356,341	349,319
Michigan	1,229,598	1,505,905	1,194,934	1,567,764
Minnesota	436,453	475,846	472,018	437,014
Mississippi	67,446	89,752	70,141	80,109
Missouri	683,097	653,615	723,916	611,020
Montana	31,486	38,749	31,638	31,256
Nebraska	203,863	172,489	210,305	201,211
Nevada	10,068	7,878	12,635	9.088
New Hampshire	41,843	55,233	52,941	49,958
New Jersey	760,944	793,625	653,685	691,453
New Mexico	16,323	14,736	17,246	21,231
New York	2,170,960	2,336,788	†2,151,191	2,329,217
North Carolina	343,683	396,618	340,027	376,779
North Dakota	55,305	62,581	37,735	43,493
Ohio	1,099,016	1,247,338	1,212,138	1,199,908
Oklahoma	225,729	205,345	286,912	236,223
Oregon	143,672	151,296	157,360	128,525
Pennsylvania	1,869,377	1,618,569	†1,852,731	1,493,733
Porto Rico	0	0	0	0
Rhode Island	75,383	65,525	†71,369	66,573
South Carolina	75,376	53,506	92,255	62,408
South Dakota	55,487	46,987	57,380	44,054
Tennessee	208,562	213,058	193,279	207,528
Texas	418,401	481,008	404,161	484,822
Utah	38,975	50,306	45,985	54,276
Vermont	26,245	38,607	23,698	49,660
Virginia	180,025	180,085	176,842	182,011
Washington	334,466	239,146	323,325	198,993
West Virginia	164,874	214,901	177,994	162,440
Wisconsin	562,363	704,770	626,004	715.784
Wyoming	25,691	19,973	31,042	24,901
Unspecified	48,647	774	†10,520	70,497
	18,033,478	18,701,439	18,258,726	18,465,336
Foreign countries	97,522	84,561	124,274	70,664
Total shipped from cement plants	18,131,000	18,786,000	18,383,000	18,536,000

*Includes estimated distribution of shipments from three plants in July and August, 1925, and from four plants in July and August, 1926. †Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1925 AND 1926, IN BARRELS

Month	Production 1925	Production 1926	Shipments 1925	Shipments 1926	Stocks at end of month 1925	Stocks at end of month 1926
January	8,856,000	7,887,000	5,162,000	5,674,000	17,656,000	20,582,000
February	8,255,000	7,731,000	6,015,000	5,820,000	19,689,000	22,384,000
March	11,034,000	10,355,000	10,279,000	9,539,000	20,469,000	23,200,000
First quarter	28,145,000	25,973,000	21,456,000	21,033,000	....	....
April	13,807,000	12,401,000	14,394,000	12,961,000	19,877,000	22,640,000
May	15,503,000	16,472,000	16,735,000	17,951,000	18,440,000	21,173,000
June	15,387,000	16,827,000	17,501,000	19,113,000	16,409,000	18,900,000
Second quarter	44,697,000	45,700,000	48,630,000	50,025,000	....	....
July	15,641,000	17,096,000	18,131,000	18,786,000	13,896,000	17,210,000
August	16,419,000	16,936,000	18,383,000	18,536,000	11,952,000	*15,718,000
September	15,939,000	16,571,000	17,711,000	18,087,000	10,247,000	14,202,000
Third quarter	47,999,000	50,603,000	54,225,000	55,409,000	....	....
October	15,992,000	....	15,309,000	....	10,979,000	....
November	13,656,000	....	10,187,000	....	14,534,000	....
December	10,713,000	....	6,917,000	....	*18,515,000	....
Fourth quarter	40,361,000	....	32,413,000	....	....	....
	161,202,000	....	156,724,000	....	....	....

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN SEPTEMBER, 1925 AND 1926, AND STOCKS IN AUGUST, 1926, IN BARRELS

Commercial district	Production 1925—Sept.	Production —1926	Shipments 1925—Sept.	Shipments —1926	Stocks at end of 1925—Sept.	Stocks at end of —1926	Stocks at end of August, 1926*
E'n Penn., N. J. & Md.	3,685,000	3,936,000	4,428,000	4,593,000	1,048,000	2,718,000	3,375,000
New York	910,000	948,000	1,072,000	1,194,000	465,000	596,000	842,000
Ohio, W'n Penn. & W. Va.	1,620,000	1,797,000	1,905,000	1,903,000	1,232,000	1,930,000	2,036,000
Michigan	1,087,000	1,415,000	1,245,000	1,614,000	716,000	1,062,000	1,261,000
Wis., Ill., Ind. & Ky.	2,403,000	2,326,000	2,697,000	2,451,000	1,828,000	1,799,000	1,925,000
Va., Tenn., Ala. & Ga.	1,289,000	1,368,000	1,341,000	1,428,000	271,000	1,029,000	1,089,000
E'n Mo., Ia., Minn. & S. Dak.	1,591,000	1,470,000	1,781,000	1,556,000	1,890,000	1,993,000	2,078,000
W'n Mo., Neb., Kans. & Okla.	1,122,000	1,046,000	1,055,000	970,000	1,498,000	1,407,000	1,331,000
Texas	399,000	437,000	372,000	438,000	288,000	417,000	418,000
Colo., Mont. & Utah	245,000	247,000	236,000	288,000	417,000	384,000	425,000
California	1,223,000	1,272,000	1,199,000	1,318,000	451,000	458,000	504,000
Ore. & Wash.	365,000	309,000	380,000	334,000	143,000	409,000	434,000
	15,939,000	16,571,000	17,711,000	18,087,000	10,247,000	14,202,000	15,718,000

*Revised.

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN AUGUST, 1926

Imported from	District into which imported	Barrels	Value
Belgium	Florida	22,400	$26,282
	Galveston	2,996	4,348
	Hawaii	17,998	26,818
	Maine & N. H.	13,333	19,297
	Massachusetts	78,084	107,722
	Mobile	9,586	14,621
	New Orleans	19,826	26,252
	New York	602	761
	Oregon	16,526	28,596
	Philadelphia	63,971	102,699
	Porto Rico	995	2,100
	San Francisco	1,763	2,524
	Washington	16,681	21,082
	Total	264,761	$383,102
Canada	Maine & N. H.	138	$487
	St. Lawrence	2,985	6,290
	Vermont	268	470
	Total	3,391	$7,247
Denmark and Faroe Isl.	Porto Rico	31,907	$58,768
Esthonia	New York	24,658	$70.709
France	Massachusetts	12,981	$18,401
	New York	8,936	14,446
	Total	21,917	$32,847
Japan	Hawaii	2,997	$5,776
United Kingdom	New York	1,007	$2,083
	Grand total	350,638	$560,532

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO IN AUGUST, 1926*

	Barrels	Value
Alaska	2,699	$8,312
Hawaii	16,053	36,817
Porto Rico	1,607	4,051
	20,359	$49,180

*Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1925 AND 1926, IN BARRELS

Month	1925	1926
January	7,017,000	9,074,000
February	9,497,000	10,931,000
March	9,962,000	12,284,000
April	9,731,000	12,934,000
May	9,053,000	11,649,000
June	7,937,000	10,086,000
July	6,961,000	8,515,000
August	5,640,000	*7,362,000
September	4,561,000	6,095,000
October	4,086,000	....
November	5,013,000	....
December	6,469,000	....

*Revised.

EXPORTS AND IMPORTS*

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN AUGUST, 1926

Exported to—	Barrels	Value
Canada	2,775	$12,675
Central America	1,928	5,759
Cuba	8,548	21,274
Other West Indies	7,907	19,445
Mexico	10,371	31,100
South America	27,620	96,038
Other countries	5,797	30,198
	64,946	$216,489

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1925 AND 1926

Month	Exports 1925 Barrels	Exports 1925 Value	Exports 1926 Barrels	Exports 1926 Value	Imports 1925 Barrels	Imports 1925 Value	Imports 1926 Barrels	Imports 1926 Value
January	71,596	$207,547	72,939	$216,431	231,258	$364,196	360,580	$576,717
February	56,249	181,356	73,975	220,706	119,077	206,308	314,118	527,948
March	65,248	200,410	69,080	205,647	218,048	337,039	493,241	812,968
April	89,508	263,831	96,296	284,772	197,686	280,826	257,302	398,114
May	85,385	250,845	78,601	224,365	186,897	286,959	223,130	337,031
June	71,343	217,899	80,684	248,814	254,937	409,539	335,570	495,744
July	98,141	286,543	130,822	370,220	335,118	499,602	250,862	395,981
August	103,961	289,904	64,946	216,489	379,847	611,551	350,638	560,532
September	102,649	285,225	....	....	513,252	789,121	....	....
October	73,369	228,467	....	....	535,050	824,268	....	....
November	101,825	294,201	....	....	388,604	678,518	....	....
December	100,323	296,900	....	....	295,543	526,001	....	....
	1,019,597	$3,003,128	....	....	3,655,317	$5,813,928	....	....

Canadian Cement Statistics for 1925

REVISED statistics have just been issued showing that the sales of cement in Canada during 1925 totaled 8,166,597 bbl., valued at $14,046,704, as compared with 7,498,624 bbl. at $13,398,411 in 1924. Imports during 1925 amounted to 21,849 bbl. and exports totaled 997,915 bbl. The following are the principal statistics:

	1924	1925
Number of establishments	10	11
Capital investment	$36,766,574	$38,081,583
Number of employes	1,837	1,926
Salaries and wages	$ 2,531,622	$ 2,511,400
Cost of fuel and electricity	2,872,711	2,848,904
Value of products	13,398,411	14,046,704

Receiver Appointed for Unic Cement, Ltd. (Canada)

J. PAUL VERMETTE has been appointed liquidator of the Unic Cement, Ltd., which operates a small plant near Montreal, Que. The company had two issues of bonds of $250,000 each, of which about $400,000 is outstanding. The preferred shares amount to $200,000 and the common $800,000, while creditors claim $175,000. While the earnings are much below the figures required to meet fixed charges, they are not low enough to cease operations.

The financial difficulties of the Unic company are said to be due to the prevailing low prices of cement in the province of Quebec. It is possible, the report states, that the property will pass into the hands of the bondholders, who are expected to continue to operate the plant.

Irish Rock Phosphate Deposit

AN apparently valuable deposit of phosphate rock has been discovered in the western part of County Clare; and the Free State may, as a result of the discovery, cease to be an important importer of rock phosphate, and become an exporter if transport difficulties obstructing the development of the deposit on a large commercial scale can be overcome. The owner of the deposit is seeking funds to develop the property. Additional data submitted by Consul Harold M. Collins, Dublin, relative to this deposit are available to interested firms upon request to the Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.—*New York Commercial.*

E. E. Evans Recommends Quarry Code at Ohio Safety Conference

Both Crushed Stone and Cement Quarry Operators Attend Columbus Meeting

A CONFERENCE on safety in Ohio quarries was held in the Neil House, Columbus, September 24, under the auspices of the division of safety and hygiene of the State Industrial Commission. T. P. Kearns, head of the division, presided. About 50 persons were present.

Edward E. Evans, president of the Whitehouse Stone Co., Toledo, and president of the Ohio Crushed Stone Association, urged the formulation of a safety code for quarries as a protection of both employers and employes. Mr. Kearns announced that a tentative code has been worked out by the state and that it is planned to adopt a permanent code before long. In his talk on this subject, Mr. Evans said:

Would Compel Observance

"I believe it is absolutely imperative that all stone producers who operate quarries become active in the establishment of a safety code in the interest of accident prevention. They should stand solidly behind the safety movement launched by the Division of Safety and Hygiene not only because of its economic value, but from a humanitarian standpoint.

"The basic rate established by the Industrial Commission covering quarry operations is altogether too high as compared with many other industries where the hazards are equally as great. Several of the stone producers in the state, realizing the seriousness of the situation, have adopted stringent safety measures and are carrying on an active campaign in the interest of accident prevention. They have expended not only considerable time, but a large amount of money in erecting guards and otherwise safeguarding the employe to the end that accidents may be materially reduced.

"These same producers are being penalized because of the negligence on the part of many operators in this state who have paid little attention to the safety of the employe, with the result that many accidents, and in some cases, fatalities, have occurred. This of course is not fair to the operators observing safety measures and will not be corrected until the state establishes a safety code and *compels its observance*."

*Better Highways, October, 1926, published by the Ohio Crushed Stone Association.

Tells of Safeguard

"Preventing Accidents Due to Explosives" was the subject of a very interesting talk by Frank F. McLaughlin, blasting engineer, France Stone Co., Toledo.

E. E. Evans

Mr. McLaughlin dealt largely with the safeguards that should be used in blasting. He answered many questions that had been put to him relative to methods of blasting and the use of explosives, in order that the danger of mishaps might be kept to the minimum.

Addresses also were given by H. G. Jacobsen, Chicago, safety director of the Portland Cement Association, who spoke on "Prevention of Accidents from Miscellaneous Causes; Hand Tools, Burns, Motor Vehicles, Poor Housekeeping," and Russell Frame, chairman of the central safety committee of the Alpha Portland Cement Co., Easton, Penn., talked on "How to Organize a Quarry for Safety With Special Reference to the Importance of Foremanship in Reducing Accidents." E. I. Evans, actuary of the state industrial commission, discussed rates and Jay Thompson, manager of the Toledo Safety Council, told of the efforts being made to reduce accidents in that city. He submitted to the conference a number of first-aid points, which were listened to attentively.

The conference lasted all day and was one of extreme interest. Both state officials and quarry owners and managers expressed the opinion that much good would be derived from it.

Safety in Machine Operations in the Stone Industry

D. S. Souder, director, insurance and safety, France Stone Co., Toledo, said:

"It is almost universally true that some accidents do not occur the first time that the injured person is doing the same thing that he is guilty of doing when injury occurs. He develops a habit of doing things carelessly because he is lucky when he starts doing them that way. We hear of grade crossing accidents — families wiped out. I venture to say that the drivers of these cars have been guilty of crossing railroads many times without stopping, looking or going into second gear. The same is true in the stone industry. Conditions develop, such as the accumulation of oily waste or other combustible material and for a considerable length of time this refuse lies dormant and then a fire occurs and destroys the plant.

Must Stop Bad Habits

"Superintendents and foremen must learn that it is up to them to stop the bad habits of their employes and clean up these fire and accident hazards which are the result of gradual accumulation of combustible material and carelessness among the employes. It is because of the fact that statistics prove that injured workmen have previously been doing the same thing that they were doing when injury resulted that we are able, in the safety movement, to definitely hold the superintendent or foreman responsible for the accidents at his plant.

"Bad habits, regardless of whether a man gets hurt or not, must be promptly stopped. Men walk under a lift and, not getting hurt, develop a habit of walking under the lift so that some day they will walk underneath a lift when a chain or cable breaks. It is just like crossing a railroad track without stopping, looking and listening.

"It is safe to say that the best and most efficient operation is, in the long run, the safest. It will eventually pay big dividends in any quarry to have a place for everything and take the necessary time to put everything in its place. It is far better to properly store a broken gear than to drop it where someone will break a leg perhaps not this week or this month but, possibly, at some future time. Accidents result more from omissions and things that you do not do than from things which you do do. While everything possible must be done to make getting hurt a difficult job, it must be remembered that 90% of accidents are caused by human carelessness. The majority of us have advanced to such a position that we have habits of carelessness. Employes must be 'sold' upon the matter of safety. They must be taught to realize that it is their flesh and blood that is at stake. The fact that accidents are an economic problem for the employer does not begin to compare with the fact that accidents are an economic problem for the employe. In the majority of cases he is unprepared from an insurance standpoint to withstand the economic loss of time or of life.

High Cost of Accidents

"As many of you are in the position of being a part of management, it might be well to mention that it takes $104.30 of payroll money to give an employe $100 for the work which he renders. Then again, talking accidents in terms that a stone man appreciates, namely: *tonnage,* apply your accident costs in terms of tonnage which you have to produce in order to pay for the accident losses and, gentlemen, I think the depreciation in yearly tonnage totals will be so *great* that it will startle you into action. For an example: I know of an accident where there was one personal injury which cost $2000. Figuring that in terms of tonnage at 20 cents per ton, it would take 10,000 tons of stone to pay for that accident loss. How long would it be necessary to operate your plant to produce that 10,000 tons of stone to pay for a needless bit of carelessness?

"Gentlemen, that is enough concerning the economic side of it and, in closing my talk, I wish to appeal to you for consideration of the human element which—after all is said—is the most important factor to us all.

Safety, a Sales Problem

By J. R. Davis

Works Manager, United States Gypsum Company, Gypsum, Ohio

IT has been generally recognized since the beginning of the safety movement that any organization must be practically sold on the idea of safety before satisfactory progress can be made in the prevention of accidents. All have undoubtedly used this very expression in one way or another, but how many of you have actually applied good sales tactics in putting safety across in your plant? It is only logical, if men must be sold on the subject, that sales methods be used, and it is just as easy to sell safety as it is to sell some article of merchandise.

One of the greatest sales weapons in the world today is modern advertising. It is a science in itself and takes on many forms, such as outdoor advertising, magazine, and newspaper advertising, form letters, etc. All of these have their value in a good safety organization. Signboards, bulletin boards, plant papers, and circular letters should be, and are being used to advertise safety.

But are we using good advertising practice in this phase of our work? A good advertising man realizes the value of attractive sign boards and frequent changes in their makeup so that they constantly attract attention. He places them where the most people will see them and wastes little money in boards on the back roads and by-ways.

Are we applying these same principles to our safety advertising? Our bulletin boards should be made as attractive as possible, the bulletins should be regularly changed and attractively arranged to draw the men's attention. News and other bulletins may be used on the board for the purpose of drawing the men so that they will read the safety bulletins while there. Bulletin boards and sign boards should be placed where they will be seen by the most men. Don't stick them off in corners, in out-of-the-way places, and expect men to read them. At night they should be well lighted, just as the live advertising man lights his sign boards. The same principles apply to the use of house organs, circular letters, etc. More thought should be given to the actual sales value of these mediums.

I recently heard a luncheon club speaker say that modern advertising was the greatest spreader of Bolshevism in the world today. His reason is that it makes us all dissatisfied with the things we have. I do not believe in Bolshevism or desire to spread it, but if our safety advertising can make the men dissatisfied with their careless lot, we have made a big advance in getting safety across.

I know that many men will say this is not a new thought. You are following all these points at the present time and still do not receive the proper reaction from your men. Remember though that advertising is only a part of selling, and don't deceive yourself that you are really selling by doing only this. Here is where the real selling comes in.

A modern sales organization consists of a sales manager, division managers, territory supervisors, and actual salesmen. These may be backed up by special sales representatives, demonstrators and service men. All of these are already found in your own organizations, properly placed and fairly well equipped to take part in an organization to sell safety.

In our larger plants the safety supervisor, or the safety engineer, or whatever he is called, is the sales manager for safety. It is his duty to direct the advertising and the efforts of the organization in conducting your sales campaign. Naturally, he must be properly qualified to fill the position and must be properly backed up by the management, the same as any sales manager. In a smaller plant where it is not possible to have a full time safety man, the plant manager becomes sales manager for safety, the same as most small plant managers are also sales managers for their products.

If there are various departments in the plant, the heads of these departments are the division managers for safety. They are the ones who should know their own territories and under the proper guidance of the safety man, they should direct the work in their department. In the larger plant where there are additional men in the safety organization, some of these may act as division managers for certain parts of the plant and the department head then becomes a territory supervisor in the scheme. Other men in the safety department, such as inspectors, and so on, take their place as the demonstrators and service men for safety. They demonstrate the proper and safe way that work should be done and see that the workmen derive the greatest benefit from the safety work.

The next, and probably most important part of the organization, is the actual sales force. Who are the safety salesmen in your plant?

Your foremen. Much has been written and said regarding the foreman's place in accident prevention, but after all isn't he really the direct salesman of safety, and are not results produced directly proportional to his ability as a salesman? No live sales manager would put a salesman on the road to sell his product unless that man knew considerable about the product and was himself actually sold on it. It is unfortunate, but true, that most of us go about our safety work blindly, scarcely realizing the value of the foremen in this work. Many times our foremen are working directly against our best interests, because they are not sold and the proper efforts have not been made by the organization to sell safety to each of them, and through them to the men in the plant.

One thing that a sales manager follows is the number of calls made by a salesman. It has been definitely determined that the volume of sales is in almost direct proportion to the number of calls made. Many com-

panies today have adopted automobiles for the very reason that they speed up their salesmen and increase the number of calls. Since the number of calls, or contacts, determines largely the volume of sales, who, then, in your organization is better fitted to sell safety than the foreman who is in constant contact with the men?

There are many ramifications in the modern sales organization, but after all it is personal contact which is largely responsible for most of the sales that are made. Advertising places the man in a favorable state of mind to the thing that is being sold, but it is usually the personal contact which finally closes the sale. How many automobiles would be sold as a direct result of advertising if the live auto salesman did not follow up the prospect and close the deal? There are today several instances of great success in industry based entirely on the program of national advertising and direct personal contact through a widespread sales organization. Two of these that come to my mind are Fuller Brushes and Realsilk Hosiery; and let me say here that if these companies stopped their national advertising, or withdrew their salesmen from the field, they would soon cease to exist.

Their success is dependent on the continuation of sales work; and the success of our safety work in the end is not so much dependent on how good a sales organization we build up, but on how well they continue to use their salesmanship, for few men stay sold on anything.

No company is ever really a success, no matter how strong their sales organization, unless they have rendered a direct service to their customers and stood back of their products. In exactly the same way our efforts in selling safety will be of no avail unless we back it up with the proper spirit of service and prove to the men that we stand back of the safety movement without any reserve.

Government Selects Second Potash Exploration Site

THE AREA designated as second in order of preference for exploration for commercial deposits of potash in the federal government's program to develop ample domestic potash supplies centers at the Mary Baker No. 1 Discovery oil well in the southeast quarter of the northeast quarter of section 8, Groome Survey, Upton County, Texas, it is announced by the Bureau of Mines of the Commerce Department. The bureau is empowered to choose any point within a two-mile radius of this oil well for the drilling of the test hole.

This is one of the four alternative locations recommended by the United States Geological Survey as being favorably situated for potash exploration purposes. Announcement of the location of the first area in the northwest corner of section 4, William Teer Survey, Upton County, Texas, centering about the Dixie Hughes No. 1 oil well, was made recently.

Under the terms of the enabling act, approved June 25, 1926, which authorizes the expenditure of $100,000 per annum during a period of five years for the purpose of potash exploration, the Bureau of Mines is required to negotiate contracts with all land owners and holders of mineral rights within a radius of one mile of the point selected for drilling. The failure of any land owner or holder of mineral rights to accept the government's terms would, therefore, block the drilling program in that particular area.

Join the Red Cross!

THE American National Red Cross will hold its tenth annual roll call from Armistice Day, November 11, to Thanksgiving, November 25, when all are cordially invited to become members of this great organization. Membership dues paid at that time maintain the work of the Red Cross—local, national, and international—throughout the coming year.

Symbol of service used by the American National Red Cross in their 1926 membership drive

The work of this organization is not unknown. Wherever disaster has occurred, the Red Cross is one of the first to be on hand offering relief and the benefits of an organized first aid. But another side of their work and which is of vast importance to industries, is the large amount of first-aid instruction given in various fields of activity. This past year over 19,000 were instructed and completed the Red Cross course.

On the basis of this service, and accomplishments in other fields equally valuable to the whole country, the American Red Cross will seek new members and renewal of old memberships.

Keystone Phosphate Starts Operations at Bear Lake

THE Keystone Phosphate Co., Nampa, Ida., has started operations at the Bear Valley phosphate mine, according to a recent announcement in the Nampa (Ida.) *Free Press.* The Bear Valley property, which is located near Paris, Ida., and is well known over the entire west, was purchased recently by the Keystone company from the Bear Lake Phosphate Co.

Harry Jackson of Nampa has been appointed supervising engineer. As soon as installation of the machinery has been completed, the company hopes to have a monthly output of 10,000 tons, most of which will be shipped to the central states. Some will go to California, an order having been placed for 40,000 tons. They also have an order for 1,000 tons to be shipped to Japan.

New York Building Material Dealers Discuss Financing

BUILDING material dealers of Manhattan and the Bronx met recently and abruptly stopped further sale of basic building materials where the retained percentage and other credit abuses were left in the contract so indefinitely as to suggest the financing of undated owners' building operations, says Allen E. Beals in the current Dow Service Daily Building Reports.

In addition to this they reaffirmed their policy of last June to the effect that they would keep rigidly to the business of selling building materials, putting themselves on record as discountenancing incidental financial aid to builders whose credit position is not satisfactorily established and whose policies with regard to trade practice fall short of the standards constituting a safe business risk.

They even went so far as to make the dead-line retroactive to October 1, 1926, so as to avoid special conditions surrounding pending transactions.

Continued pressure upon building material appliance and equipment distributors in New York City is being applied through building trade channels to induce other lines to follow the example of the Structural Steel Board of Trade members and those of the Masons' Material Dealers Association of the City of New York.

Odd Rock Used for Landscaping

ROCK of unusual appearance has brought a new industry to Oregon City, Ore. F. Esposito, landscape gardener, discovered that the rock, which had been considered worthless for twenty years, could be used very effectively to beautify residence grounds and large estates. He has leased the Telford property containing a large supply of this rock, which is porous and occurs in various shapes and sizes.—*Portland (Ore.) Oregonian.*

Book Reviews

A Modern German Compendium of Lime-Burning

DAS KALKBRENNEN UND DIE GEWINNUNG VON KOHLEN-SAUREHALTIGEN GASEN. 2nd Edition. By Berthold Block, Civil Engineer, Berlin-Charlottenburg, Germany, Otto Spamer Co., Leipzig, Germany. 512 pp., 270 illustrations. Price, 25 Rmk., paper covers, and 27.50 Rmk., cloth.

THE second edition of "Das Kalkbrennen" which was first published in 1916 meets the need that has long been felt for a good compilation of data on the burning of lime. The author has made no changes in the structure of the book, but has added the results obtained by German lime-burners in their use of substitutes for coal in firing. More economical use of coal was forced on the Germans through loss of much of their coal lands due to the terms of the peace treaty. Consequently, it is not surprising to find that excellent results in saving coal and using low grade fuel have been obtained by modification of kilns and application of principles of more efficient operation discovered by research.

In the chapters on lime kilns, there are shown various types of old and new kilns and a review of the experimental work of different scientists which brought about the change. The economical features of the shaft kiln of the mixed-feed, gas-fired and externally fired types are compared and this is done with the rotary kiln also. Ring kilns, which are rarely used in the United States because of too high a labor cost, and a tunnel kiln are discussed. Of great value is a review of the work done on the physical and chemical processes of lime-burning. This includes the effects of CO_2 gas, water, water vapor, coal, coke, etc., on the decomposition of limestone.

Several chapters are devoted to the burning process itself. The changes in shaft kiln design and the operation methods and precautions to be observed for efficient production are well treated. Kiln firing with solid, liquid and gaseous fuels and the methods by which these fuels are used are covered in brief but excellent manner. A description of an apparatus for the electrical decomposition of limestone is of interest. Perhaps too much attention is given to mixed-feed firing and the use of peat, coal substitutes and low grade fuels from the American point of view. At present we are not greatly concerned with low grade fuels in this country.

Probably one of the most important chapters in the book is that given over to the heat calculations and fuel consumption in a so-called "ideal" lime kiln. While highly theoretical, the data are valuable because of the fundamental principles involved and they furnish many ideas that serve as a basis for research which may lead to practical results. Such a kiln would utilize part of the hot gases drawn off the top of the calcining zone and put them back into the kiln, thus cutting down considerably on the amount of fuel required.

There are several sections devoted to the building of kilns and their most efficient design with respect to the type of fuel to be used. Kiln shells, lining and instructions for their care are discussed in much detail. The operation of different types of kilns with precautions to be observed in the charging and drawing are treated in several chapters. Equipment used for kiln control, such as recording thermometers, pyrometers and mechanical drawing of lime, handling, etc., are fully described.

The utilization of the CO_2 gas and equipment for drawing it off, washing and recovering is well covered. This is in line with current German practice for, in contrast to American commercial lime plants, CO_2 recovery is carried out on quite an extensive scale. Different processes and patents for using waste heat (from the gases off the top of the kiln) are illustrated.

Essentially, lime burning is carried on in Germany and Europe in about the same manner as practiced in the United States, so identical methods of control used in those countries may be applied, but it must be admitted that Europeans have, through their more careful check analyses on kiln gases, finished lime, etc., made lime production more efficient and produced better lime. The reader of the book can gain much that will be useful to him by a careful study of the chapters on kiln control.

On the whole, the book contains material which would be of inestimable value for all lime men if it were properly translated. It may not contribute anything not already known, but it must be considered that there are scarcely a half dozen really modern books on so important a subject. The worth of the book lies in the fact that the author has gathered the widely scattered information on lime burning and put it in an orderly form. The theoretical side is well taken care of, but the practical needs the addition of American methods to make it complete. The illustrations are plentiful and well chosen to fit the subject matter.

Rocks and Rock Minerals

ROCKS and Rock Minerals, by Louis V. Pirsson, formerly professor of geology in Sheffield Scientific School, has appeared in a second edition revised by Alfred Knopf, Yale professor of physical geology.

The book, while perhaps intended for students' use, is just what is wanted by the man who needs a clear, concise and simple work on the common rocks by which he may identify them sufficiently for practical purposes. Microscopic work, so important in close examination and particular identification of rocks, has been rightly omitted, as the ordinary man does not have a microscope at his command. But the general principles of petrology are well explained. There are excellent tables for the identification of rock minerals. One of these, modified from the tables of the Brush-Penfield Determinative Mineralogy, is for complete determination; the other is for rough field work. There is a table for the determination of common rocks which seems simple and yet complete. The illustrations are excellent and the book is well printed and bound.

The book is recommended to the reader who wants a simple and inexpensive work that will teach what it is necessary for the practical man to know about rocks. It is published by John Wiley and Sons, Inc., New York.

New British Book on Cement and Concrete

G. AND T. EARLE, LTD., of Wilmington, Hull, England, is one of the best known British firms making portland cement. It has been in the business since 1809. Recently the company issued a book called "The Making and Testing of Portland Cement and Concrete," and published by it at 10 shillings net. It is obviously intended more for the users of cement than for producers, but those interested in the production of cement and aggregate will find much in it that is interesting and important.

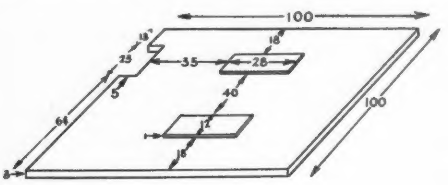
All English technical books seem to be well printed and illustrated, and this volume is an exceptionally handsome specimen of book making. The text is printed on "hand made" paper and the halftone illustrations on heavy enameled stock.

The contents include a brief description of cement manufacture, a chapter on cement testing (which includes the British standard specification revised to 1925), and chapters on quick-hardening cements, the making of concrete, the testing of concrete, and some concrete problems. An appendix gives something of the chemical analysis of cements. About a fourth of the book is given to cement testing, and another fourth is devoted to making concrete. In this section Prof. Abrams' methods and theories are explained and confirmatory results from the company's experience are given. Especial stress is laid on the necessity for clean aggregate, and this section is illustrated with a number of micro-photographs of clean and dirty sands and rock fragments.

The chapter on quick-hardening cements describes the company's "Pelumina" brand. An analysis is given showing the variation from common portland and high alumina cement. Pelumina gives a tensile strength in one day equal to the British standard specification requirements for 7 days.

Current Abstracts of Foreign Literature

Measurement of Change in Spatial Dimensions of Cements—In 1918 an instrument known as the "Comparator" was developed for the determination of the change in the spatial dimensions of various cements. This instrument, it is claimed, is used in many cement mill laboratories and the inventor of the instrument has made certain



"Comparator" for measuring changes in spatial dimensions of cements

changes and improvements in it which are described below.

In place of the transparent glass plate of the following dimensions, 12x28x1.1to1.3 mm., there is now used a glass plate made of milky glass, which makes it easier to observe the fissure cut in the cement block, particularly where dark cements are to be viewed. This also is good for test samples which assume a dark color due to their storage under water.

The arrangement of the plate is carried out in the following manner: In making the test samples, a bottom plate is placed in the mold to which two glass plates are affixed. This can be seen from the accompanying figure. The glass plates therefore represent elevations in the surface of the bottom plate. These plates are placed in the corresponding depressions in the surface of the cube samples.

When cast cements or mortars are being tested, the standard molds are made waterproof. For this purpose a thick glass plate is employed as the bottom plate and the various joints are covered with a heated mixture of beeswax and rosin, and the milky glass plate is pressed to an inner side wall of the well greased mold. These plates adhere well to the greased surfaces of the side walls but it is best in order to prevent these plates from being loosened from the walls not to pour the cement or mortar against these plates. After 20 hr. stay in the molds, the cast forms are removed leaving the glass plates firmly imbedded in the cement. The side walls are employed for the reason that the surface of the other walls is not flat enough to enable accurate measurements to be made with the comparator.

After the tests to determine the swelling and the contraction of the samples of cement have been carried out, the same samples may be used in the determination of the mechanical strength of the cement.—*Zement* (1926), **34**, 594-5.

Making Plaster Blocks Impermeable—Three different methods have been studied for rendering plaster block impermeable. In the first, the block of plaster is covered with an impermeable film which is resistant to moisture. This method has given interesting results. Thus various paints and varnishes and resistant white-washes have been employed for this purpose as well as such substances as paraffin, wax and stearic acid. The second method is to produce an insoluble compound on the surface of the plaster block, by a reaction between some substance and the plaster itself. Hydrated barium oxide has been used with considerable success for this purpose. It is supposed that the hydrated oxide penetrates into the pores of the plaster and reacts with the sulphate of lime to give a compound which is more insoluble, i.e., barium sulphate.

The third method consists in the addition of an absolutely impervious substance, resistive to water penetration, to the plaster itself when the latter is made. This, however, did not result in much success, though various substances such as zinc stearate, glue, gum tragacanth, dextrin and water glass have been employed for this purpose.—*Revue des Mat. de Const.*, April, 1926.

Deterioration of Cements—An investigation has been made to determine the action of prolonged storage on cements, the prime factors being the deterioration that might take place due to storage alone, all other possible causes being eliminated. Various cements such as portland, slag, and iron were tested, but conclusive results were obtained only for the portland cements.

In all the portland cements under test there were no signs of any deterioration in strength during the first few years of the investigation, and it was only at the end of a period of four to six years that certain types of cement showed lowered strengths, while all the rest retained the required strength.

The slag cements showed unmistakable signs of a reduction in strength within a period of only three months, and this effect was accentuated with age, so that at the end of a prolonged period of three years the strength had been reduced by about 50%.

Portland cements made with iron oxide gave results which varied very considerably according to their manufacture method. Some of these cements did not change during the first year but others showed marked changes much sooner.—*Revue des Mat. de Const., May, 1926.*

Rapid-Setting Super-Cement—A high strength and rapid setting portland cement is made from materials used in the manufacture of ordinary cement except that small quantities of iron minerals, such as pyrites are added which serve to increase the volumetric stability of the cement so made. These materials should be ground fine and the mixture made as homogeneous as possible. The clinker should be well burnt, but it must not be fused. Tests have shown that the fusion of the raw materials, when carried out under the best of conditions, generally produce a product which is inferior to that which is obtained from sintered clinker.

Fine grinding of the cement is indispensable to obtaining high initial strength. In the setting of portland cement the reaction, from the physical standpoint, is purely a surface reaction between the particles of the cement. Hence if the total surface of the particles of clinker that take part in the reaction is increased, the energy which is stored in them will be realeasd at a greater speed.—*Revue des Mat. de Const., March, 1926.*

The Automatic Shaft Kiln and Its Product—A product of just as high quality can be obtained in the shaft kiln as in the rotary kiln. Considerable data is given on the operating results obtained with these types of kilns, including information on the composition of raw materials as well as of the finished products. Various illustrations also accompany the report. The investigation is carried out advantageously in the so-called "moist chambers" with pulverized material which has been moistened and pressed into thin sheets. This method yields better results than with the ordinary fine ground preparations. — *Zement*, **15**, 370-73, 389-91, 404-7.

Cement Compositions—Material containing 12% or upwards of alumina, such as clay, kaolin, alunite, diaspore, cyanite, bentonite, slags, cryolite, feldspar, bauxite, is heated to a temperature which is insufficient to drive off all the water of crystallization. This material is mixed with other materials which contain the alkaline earths, such as the limestones, blast furnace slag, calcium oxide or calcium hydroxide, gypsum, portland cement, marl, made into a slurry, and digested with sulphuric acid. To this slurry is added further alkaline earths, producing further reaction, and then the product is burnt with or without the addition of more alkaline earth, to make a cement.

With a high percentage of sulphates, a temperature of 250 to 450 deg. F. gives a quick-setting product. Where a high percentage of calcium hydroxide is present, a temperature of 400 to 600 deg. F. is preferred. The reaction is accelerated by adding alkali to the aluminous earth before heating. The process also includes the roasting of clay, digesting it with sulphuric acid, and then adding the alkaline earths.—*British Patent No. 253,929.*

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

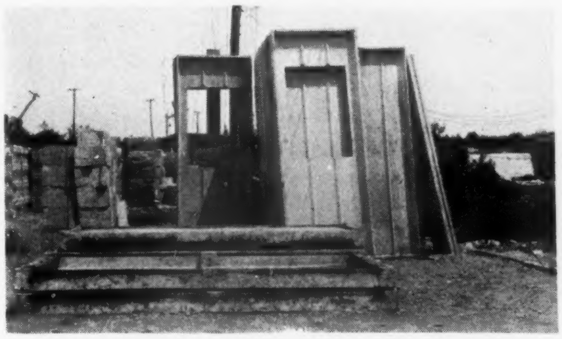
Sand and Gravel Operation That Evolved Into a Cement Products Factory

New England Sand and Gravel Company Becomes the New England Concrete Products Company

"THERE is more than one way to 'skin the cat'," as the old familiar school-boy saying goes, and so the New England Sand and Gravel Co. found when they decided to abandon a perfectly good sand and gravel operation in favor of a concrete products factory. The sand and gravel plant was one of the most notable pumping, gravity screening and washing plants in the United States, and one of the few large sand and gravel washing and screening plants in New England, when it was in operation in 1922 (a description was published in ROCK PRODUCTS, December 18, 1920).

The proprietors engaged for a long time in an uphill struggle to educate town and small city engineers in the advantages of *washed and screened* material over unprepared road-side material, which is particularly plentiful in this section of Massachusetts (West Peabody). In the meantime a cement products plant was built and operated as a by-products plant, as is now done by many sand and gravel and crushed stone operators.

Convinced, finally, that they could no longer meet local-pit competition for small orders—they were beyond reach of the Boston metropolitan district's big business—it was decided to abandon the commercial sand and gravel operation and develop the cement products end of the business. The equipment in the gravel plant was sold, and now only the shell of the plant remains. Since then the products plant has been operating on the accumulated stock of sand, but the time is approaching when a smaller sand and gravel excavating, screening and washing operation must be started again to provide the aggregate for the growing products business.



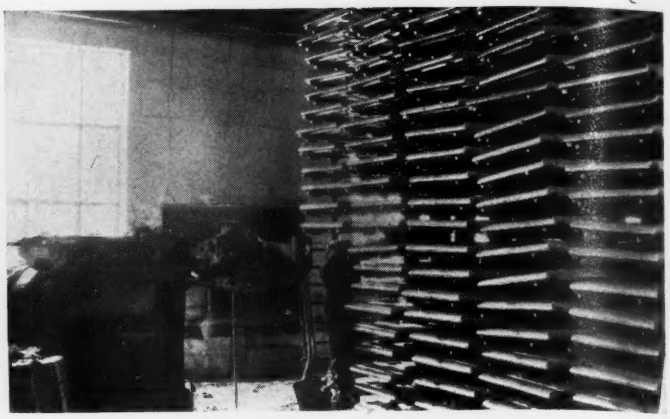
Concrete building units

The products made are blocks, brick, "waterseal" proof tile and "armorstone." The "armorstone" products are reinforced unit slabs of various sizes and shapes, which interlock and form the side walls of buildings—particularly one and two car garages. It is a patented concrete unit which is said to have made considerable progress in New Jersey, and has been found to "take" fairly well in this section of New England.

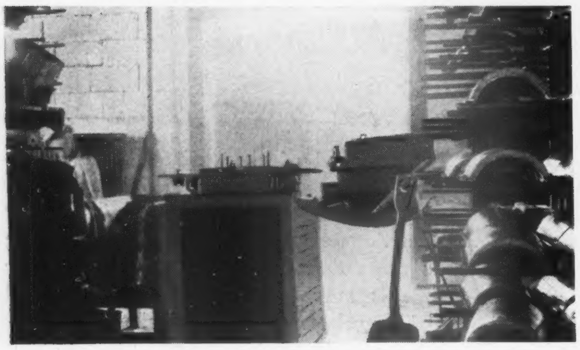
The products plant itself is not out of the ordinary, although its history

Cement products plant that grew out of the New England Sand and Gravel Co.

Interior showing type of mixer used



Pallets for roofing tile



Work bench for making Spanish roofing tile

Interior showing ball mill (left-hand corner) for grinding color

most certainly is. There are two Blystone power mixers, a power-driven Anchor block and brick machine and several benches for making the roofing tile by hand. The "armorstone" siding is poured into steel forms from a bucket on an overhead traveler. The roofing tile are made in both the flat "French" style and the "Spanish" rounded form. The coloring is vivid reds and greens—the brightest concrete products colors the writer has seen.

Adding the Color

The colors are mineral pigments mixed with portland cement and ground for several hours in a ball mill. The mixture of finely ground cement and color is troweled into the surface of the tile, insuring their waterproofness as well as the permanency of the coloring. This work is done by intelligent Italian workmen on a piece-work basis. They seem really to take pride in their workmanship.

William J. L. Roop, vice-president and general manager of the company, is also a real estate developer and builder and in this way has been able to demonstrate the virtues and beauty of cement products in a very practical way. His business has also been helped by the circulation of some attractive literature showing the color effects possible with his tile and brick.

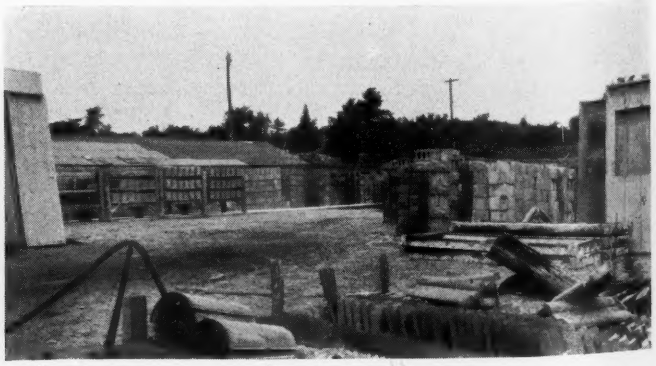
Walter Scholes is president of the New England Concrete Products Co.; Karl W. Battis, secretary and treasurer, and Herbert G. Pearse, sales manager. The company has its main office in Boston.

Concrete Pipe Company Changes Hands

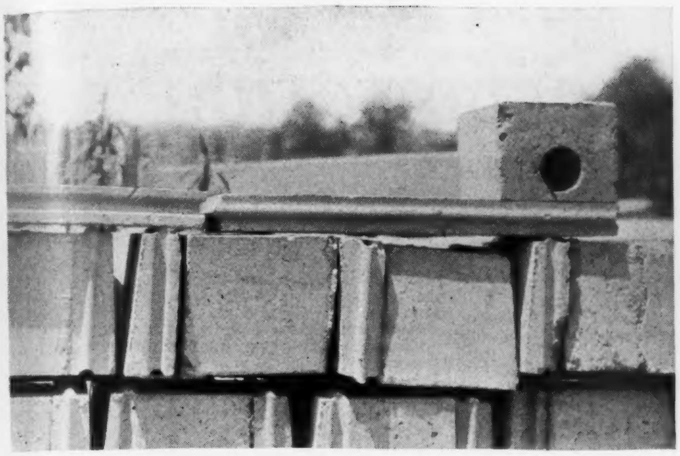
THE controlling interest in the Concrete Pipe Co., of Klamath Falls, Ore., has been purchased by W. D. Miller and his associates. C. H. Knowles, recently owner of the company, has retired and the new owners assumed possession October 10. It is planned to enlarge the plant in the near future. This is the only similar concern in southern Oregon and it is stated that there is an adequate market to make it an outstanding industry in the region.

Mr. Miller is president of the Miller Construction Co. There is, however, no connection between these two firms.

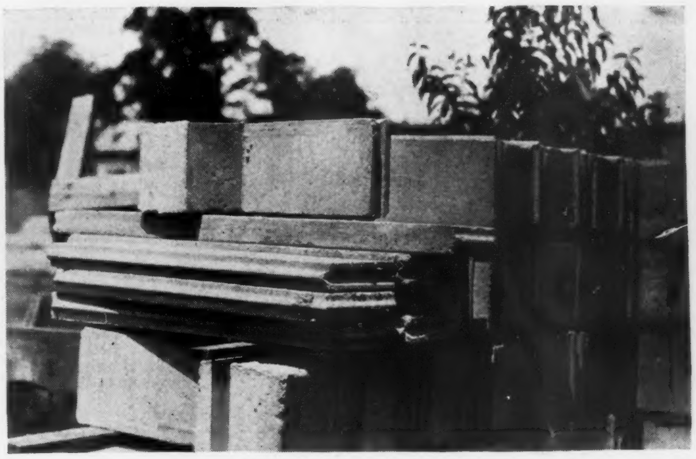
View of products plant from old sand and gravel plant building



Stock on hand includes block, brick, roofing tile and building units



Back of board with post section and runners



Board with post section attached

Building with Concrete Lumber

This Material Adapts Itself Especially to Colonial Type of Architecture

CONCRETE "boards" are a form of cement product that has been experimented with in different parts of this country and also in Europe. The main reason for such a product would seem to be the combining of the outside finish with the supporting walls, or in other words to imitate frame construction as closely as a very different material will permit.

Colonial houses were usually built of frame construction in the northern states and concrete lumber succeeds in giving the same exterior effect as is shown in the illustration. The outer surface may be painted white with any of the compounds that are adapted to concrete, or the product itself may be white.

The system employed in making the concrete lumber for this building is known as the Wigglesworth system, from its inventor. The posts that form the corners and also the posts in the wall that correspond to the studding on a frame house are cast in one piece with a section of concrete board. When the building is erected the holes in these attached corner blocks, shown in the illustration, are filled with concrete which acts as a dowel when it has set.

The boards shown in the illustration were made from cement and limestone screenings. Other aggregates were available, but the screenings were found to give a more plastic mixture and a surface of the proper texture.

One of the large Philadelphia builders used this system of construction successfully for a time and found that it was satisfactory from the technical standpoint. But the trend is way from houses of this type and toward exterior finishes of stucco, with the Spanish style, and brick, for which faced concrete brick may be used. So the making of concrete lumber has been given up.

House built with concrete lumber

Neat Post for Street Signs

IN these days when strangers are constantly passing through the streets of almost any town, on automobile trips, street signs are more essential than ever. Usually lamp posts are utilized as sign posts, but where special posts for signs have to be put up a neat concrete post has many advantages over the usual wooden or iron post.

The picture shows a very neat design for a sign post used in some of the newer residential sections of Philadelphia. It is a twisted Moorish column of the form made familiar by the present vogue for Spanish architecture, and where the houses are of the Spanish style it is all the more appropriate.

The example given was cast in a plaster-of-paris mold which was made from a clay model. The center of the post is a 2-in. iron pipe which is brought above the concrete to hold the frame to which the signs are riveted. White cement and an almost white silicious sand were used in the mix.

Some beautiful effects have been also produced by varying the design and through the use of colored aggregates. Not only are such posts distinctive but they are also economical, for after once in place they require no attention in the way of upkeep.

Sign post of cast concrete

Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning October 25:

CENTRAL FREIGHT ASSOCIATION DOCKET

14252. **Crushed stone,** carloads, White Sulphur, Ohio, to New London, Ohio. Present rate, 80c per net ton; proposed, 70c per net ton.

14253. **Crushed stone** and articles taking same rates, carloads, East Liberty, Ohio, to Springfield, Ohio. Present rate, sixth class; proposed, 80c per net ton.

14259. **Gravel and sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, molding or silica, carloads, Wellsville, Ohio, to Sharpsville and Sharon, Penn. Present rates, 10c; proposed, 105c per ton of 2000 lb.

14260. **Sand and gravel,** carloads, from siding of the Buck Hill Washed Sand and Gravel Co., west of Canton, Ohio.

To (Ohio)—	Prop. Rate	Pres. Rate	To (Ohio)—	Prop. Rate	Pres. Rate
Apple Creek	70	90	Lucas	95	120
Barberton	65	70	Mansfield	95	120
Bowdil	60	80	Marshallville	65	70
Brink Haven	90	120	Millersburg	80	90
Canal Fulton	60	70	Orrville	60	80
Clinton	60	70	Warwick	60	70
Earlville	80	90	Wooster	75	120
Killbuck	85	90			

Rates in cents per ton of 2000 lb.

14261. **Gravel and sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, from siding of the Buck Hill Washed Sand and Gravel Co. to Ohio. Present rates, sixth class; proposed rates, per net ton:

To (Ohio)—	Rate, Cents	To (Ohio)—	Rate, Cents
Baltic	75	Lodi	80
Botzum	80	Minerva	70
Breckville	90	Mogadore	70
Carrollton	70	Ross	70
Chagrin Falls	90	Smithville	70
Chili	80	Sonnerberg	70
Cleveland	90	South Park	90
Fresno	80	Spencer	85
Howenstein	70	Valley Jct.	80
Kent	80	Wellington	90
Krumroy	70	Justus	70
Leesville	80		

14265. **Lime,** common or hydrated, carloads, Becks, Mitchel, Murdock and Salem, Ind., to east bank Upper Mississippi River crossings. To apply only on traffic destined to Trans-Mississippi River territory. Present rate, 19½c; proposed 12½c.

14266. **Crushed stone,** carloads, Marble Cliff and West Columbus, Ohio, to Ripley, W. Va. Present rate, 260c per net ton; proposed, 240c per net ton.

14267. **Crushed stone,** carloads, to Detroit, Mich., from Silica, Holland, Martin, Whitehouse, Woodville, Gibsonburg, Luckey and Maple Grove, Ohio. Proposed rate, 95c per net ton.

14288. **Gravel and sand,** except blast, core, engine, filter, fire or furnace, foundry glass, grinding or polishing loam molding or silica, carloads, Wellsville, Ohio, to Sharpsville and Sharon, Penn. Present rate, 10c; proposed, 105c per ton of 2000 lb.

14298. **Sand, viz.:** Blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, Torpedo, Penn., to Oil City and Sheffield, Penn.

Present and proposed rates (in cents per net ton):

To	Prop.	Pres.
Oil City, Penn. Route, N. Y. C. R. R., Titusville, Penn., and P. R. R.	126	230
Sheffield, Penn. Route N. Y. C. R. R., Warren, Penn., and P. R. R.	126	310

14302. (a) To establish on **dolomite** and **fluxing stone,** carloads, from Carey and McVittys, O., to points in C. F. A. territory same commodity rates as in effect from Narlo, O.

(b) To establish rate of 166c per gross ton on dolomite and fluxing stone, carloads, from Martin and Narlo, O., to Ft. Wayne, Ind.

Present rate, 125c per gross ton.

14305. **Gravel and sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, Winona Lake, Ind., to Goshen and Elkhart, Ind. Present rates, 87c and 97c per net ton; proposed, 82c to Goshen, Ind., to 92c per net ton to Elkhart, Ind.

14307. **Crushed stone,** carloads, Marble Cliff, O., to Ohio. Present and proposed rates (cents per net ton):

To—	Prop.	Pres.
Valley Crossing	60	70
Wellston	80	90
Jackson	80	90
Vinton	100	6th class

14311. **Sand and gravel,** carloads, Marietta and Gravel Bank, O., to points in West Virginia. Present and proposed rates—As shown in the following tabulation:

To—	Pres. rate	Prop. rate
Moundsville	$1.40	$1.25
Thompson	1.40	1.25
Hornbrook	1.40	1.25
Chestnut Hill	1.40	1.25
France's Mine	1.40	1.25
Whittaker	1.25	1.25
Woodland Mine	1.25	1.25
Woodland	1.25	1.25
Graysville	1.25	1.25
Clarington	1.25	1.25
Wells Pit	1.25	1.15
Proctor	1.25	1.15
Hannibal	1.15	1.15
New Martinsville	1.15	1.15
Mendota	1.15	1.15
Paden City	1.15	1.15
Sistersville	1.15	1.15
Friendly	1.15	1.10
Long Reach	1.05	1.05
Bens Run	1.05	1.05
Raven Rock	1.05	1.00
Spring Run	1.05	1.00
St. Marys	1.05	1.00
Belmont	1.05	1.00
Eureka	1.05	1.00
Hammet Siding	1.05	.90
Salama	1.05	.90
Willow Island	1.05	.90
Waverly	1.05	.90
Williamstown	1.05	.90
Pohick	1.05	.90
Ravenswood	1.15	1.10
Willow Grove	1.15	1.10
Ripley Landing	1.15	1.10
Millwood	1.15	1.10
Letort	1.15	.....
Longdale	1.15	.....
Graham	1.15	.....
New Haven	1.15	.....
Hartford	1.25	1.15
Mason City	1.25	1.15
Clifton	1.25	1.15
Morgansville	1.40	1.25
Long Run	1.40	1.25
Industrial School	1.40	1.25
Salem	1.40	1.25
Bristol	1.40	1.25
Phoenix Mine	1.40	1.25
Wolf Summit	1.40	1.25
York	1.40	1.25
Wilsonburg	1.40	1.25
Clarksburg	1.40	1.25
Bridgeport	1.60	1.50
Flemington	1.60	1.50
Simpson	1.60	1.50
Webster	1.60	1.50
Grafton	1.60	1.50

14315. **Crushed stone,** carloads, Carey O., to Painesville and Ashtabula, O. Present rate, 6th class; proposed, 100c per net ton to Painesville, O., and 120c per net ton to Ashtabula.

14328. **Lime,** Durbin and Cold Springs, O., to Eaton, Ind. Present rate, 14c; proposed, 12½c.

14333. **Crushed stone,** carloads, Martin, O., to Wickliffe, O. Present rate, 100c per net ton; proposed, 90c per net ton.

14336. **Crushed stone** and articles taking same rates, carloads, Findlay, O., to Milford Center and Mechanicsburg, O. Present rate, 100c per net ton; proposed, 95c per net ton.

SOUTHERN FREIGHT ASSOCIATION DOCKET

29692. **Sand and gravel,** from Montgomery, Jackson's Lake, Prattville Jct., Oktamulke and Coosada, Ala., to Grand Bay and St. Elmo, Ala. Present rates range from 160c to 170c per net ton Proposed rates on sand and gravel, subject to present description and minimum weight: From the points mentioned to Grand Bay, 149c; from Montgomery to St. Elmo, 144c; from the other points to St. Elmo, 149c per net ton. Suggested rates are aligned with current rates from Montgomery to Theodore, Ala.

29696. **Sand and gravel,** from P. R. V. R. R. station to Slidell, La. In lieu of rate of 11½c per 100 lb., it is proposed to establish rate of 70c per net ton on sand and gravel, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Goodyear, Megehees Crossing and Emery, Miss., to Slidell, La., made in line with rates in effect between points in the same general territory.

29709. **Lime,** from Roberta and Newala, Ala., to Bastrop, La. Present rate, 468c; proposed on lime, carloads, minimum weight 30,000 lb., from and to points named, 470c per net ton. This revision will remove fourth section departures by making the rate to Bastrop the same as to intermediate points, such as Monroe, Fayville, La., etc.

29726. **Sand, gravel and chert,** from Montgomery, Ala., to Cuthbert, Ga. In lieu of rate of 120c per net ton, it is proposed to establish rate of 113c per net ton on sand, gravel and chert, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to visible capacity, actual weight will apply, from Montgomery, Ala., to Cuthbert, Ga., applicable via S. A. L. Ry., to Richland, Ga., and G. F. & A. Ry., or the same as rate applicable via C. of Ga. Ry. direct.

29751. **Sand,** from Carrollton, Miss., to Memphis, Tenn. In lieu of combination rate of 230c per ton, it is proposed to establish through rate of 150c per net ton on sand, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to visible capacity, actual weight shall govern, from Carrollton, Miss., to Memphis, Tenn.

29781. **Lime,** from Alabama points to Russellville, Ala. In lieu of rate of 290c per net ton, it is proposed to establish intrastate rate of 260c per net ton on lime, carloads, minimum weight 30,000 lb., from Keystone, Graystone, Wilmay, Saginaw, Longview, Varnons, Newala, Roberta, Calera and Pelham, Ala., to Russellville, Ala., same as rate suggested in the general lime revision.

29784. **Lime,** from Anniston, Ala., to Texas points. The present rate on lime (calcium), carbide of, carloads, from Anniston, Ala., to Texas common points, Beaumont, Houston and Galveston, Tex., and points taking same rates as per S. W. L. Tariff, I. C. C. 1807, and S. W. L. Tariff, I. C. C. 1777, is 102c per 100 lb., subject to minimum weight of 36,000 lb. It is proposed to continue the rate and carload minimum weight referred to, and establish a rate of 95c per 100 lb., with carload minimum weight of 70,000 lb., to be used alternatively. The rate of 95c being the same as in effect from Keokuk, Ia., to these destinations.

29791. **Sand,** from Gravel Siding, Iuka, Miss., La Grange and Saulsbury, Tenn., to Florence, Ala. —Cancellation. It is proposed to cancel the commodity rate of 68c per net ton on sand, carloads, from and to points mentioned, account of no movement. Local rates to apply after cancellation.

29802. **Sand and gravel,** from Montgomery District sand and gravel pits on the L. & N. R. R. to Georgia, Florida & Alabama Ry. stations. Submittal 29396 suggested rate of 176c per net ton on sand and gravel, carloads, straight or mixed, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Montgomery District sand and gravel pits of the W. Ry. of Ala. It is now proposed to establish the same rate to these stations from sand pits in the Montgomery District located on the L. & N. R. R., viz.: Jackson's Lake, Prattville Junction, Coosada and Oktamulke, Ala.

29823. **Sand,** from Mack, Ga., to S. A. L. Ry. stations in Florida. In lieu of lowest combination rates, it is proposed to establish the following through rates on sand, carloads, minimum weight 90% of marked capacity of car, except where cars are loaded to visible capacity, actual weight will govern, from Mack, Ga. To stations Lyles and Tedder, Fla., 126c; Falmouth, Fla., 126c; Dickert, Fla., 131c; Houston, Welborn and Ogden, Fla., 135c per net ton.

SOUTHWESTERN FREIGHT BUREAU DOCKET

9998. **Sand,** from Festus, Mo., to Memphis, Tenn. To establish a rate of 11c per 100 lb. on sand, carloads, minimum weight 90% of marked

capacity of car, except when actual weight of shipment loaded to full visible capacity of car is less, the actual weight will apply, but in no case less than 40,000 lbs., from Festus, Mo., to Memphis, Tenn. The rate from Pacific, Mo., to Memphis, Tenn., is 11c per 100 lb. and traffic from Pacific, Mo., to Memphis moves through Festus, Mo., and shippers at Festus, Mo., are unable to compete with shippers at Pacific, Mo., though Festus, Mo., is 58 miles nearer.

10025. **Lime,** from points in Alabama to Bastrop, La. To establish a rate of $4.70 per ton of 2000 lb. on lime, carloads, minimum weight 30,000 lb., from Roberts and Newala, Ala., to Bastrop, La. The above change, it is stated, is desired in order to remove fourth section departures.

10027. **Lime,** between points in Arkansas. To establish a rate of 17½c per 100 lb. for distances over 400 miles, on lime, carloads, minimum weight 24,000 lb., from and to points in Arkansas. On page 67 of Arkansas Distance Tariff 5E, no rates are published on lime for distances over 400 miles, although, it is stated, on other commodities the same rate is published for distances over 400 miles as is published for distances 400 miles and less.

10030. **Ground limestone,** from points in Texas to points in Louisiana. To establish same mileage scale on ground limestone, in carloads, minimum weight 50,000 lb., from Coreth and Dittlinger, Tex., and other producing points to points in Louisiana named in Item 6142 of S. W. L. Tariff 8G as now applies from Harrys, Tex., rates to be computed on actual distance via route of movement. Shippers state that the present class basis is prohibitive.

WESTERN TRUNK LINE DOCKET

3089-B. **Agricultural limestone,** carloads, from Keokuk, Montrose and McManus and Tucker Siding, Iowa, to representative points in Missouri:

Keokuk

To	Present, Cents (*)	Proposed (†)
Ashton	3½	$ .70
Crawford	4	.80
Edina	5½	.90
Keble	6½	1.10
Meadville	11	1.30
Mexico	11	1.50

Montrose

To	Present, Cents (*)	Proposed (†)
Ashton	3½	$ .70
Crawford	4½	.90
Edina	6	1.00
Keble	6½	1.10
Meadville	11	1.40
Mexico	11	1.50

McManus and Tucker Siding

To	Present, Cents (*)	Proposed (†)
Ashton	3½	$ .70
Crawford	4	.80
Edina	5½	.90
Keble	6½	1.10
Meadville	11	1.30
Mexico	11	1.50

*Per 100 lb.
†Per net ton.

Minimum weight 90% of marked capacity of car, except when loaded to full visible capacity, actual weight, but not less than 40,000 lb.

3080-B. **Lime,** carloads, from Mankato, Minn., to following stations: Steward, Goehner, Beaver Crossing, Cordova, Exeter, Sawyer and Geneva, Neb. Present, 23c per 100 lb.; proposed, 23½c per 100 lb. Minimum weight 40,000 lb.

3545-Q. **Sand,** carloads, from Kansas City, Mo., to Iowa City, Ia. Present, 17c per 100 lb. (5th class); proposed, 11c per 100 lb. Minimum weight 90% of the marked capacity of the car, except that when weight of shipments loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb. (By shipper.)

TRUNK LINE ASSOCIATION DOCKET

14083. To revise arbitraries applicable on **crushed stone,** carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, as published in reference 92, page 11, Supplement 18 to B. & O. R. R. Eastbound Rate Bases and Billing Instructions, Agent Schubert's I.C.C. A4:

From Millwood to—	Prop.
Angerona, W. Va.	80
Cottageville, W. Va.	80
Evans, W. Va.	80
Ripley, W. Va.	80

Reason—Proposed arbitraries compare favorably with existing arbitraries applicable to brick and cement.

M698. **Marble dust** and **marble chips,** carloads, minimum weight per O. C., to N. Y. O. & W. Ry. stations, Meadow Brook, N. Y., to Oswego, N. Y., inclusive, from New York, Brooklyn, Long Island City (Queensboro Terminal), N. Y., and New York harbor, rates ranging from 16c to 18c per 100 lb., and from Weehawken, N. J., rates ranging from 10c to 18c per 100 lb.

Reason—To adjust rates and place them on the proper basis. N. Y. C. R. R. now publishes rate of 18c to this territory.

M-703. **Lime,** carloads, minimum weight 30,000 lb., from Carson, Karo and Riverton, Va., to P. R. R. stations on the New Holland Branch as far as Honeybrook, Penn., and stations on the Lebanon Division as far as Colebrook, Penn., $2.27 per 2000 lb. Reason—Proposed rate is the same as now published to Lancaster and Downingtown, Penn.

14090. **Gravel and sand,** other than blast, engine, foundry, glass, molding or silica, carloads, from West Winfield Penn., to Option, Penn., $1.15 per 2000 lb. Reason—Rates compare favorably with existing rates from and to points in the same general territory. File 43255.

14101. (a) **Sand** (other than blast, engine, filter, foundry, glass, molding, quartz, silex or silica) and gravel (other than molding gravel), W. L. (b) Sand (blast, engine, filter, foundry, glass, molding, quartz, silex or silica) and molding gravel, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply. From Group 1—Bellmawr, N. J.; Blenheim, N. J.; Clementon, N. J.; Downer, N. J.; Folsom, Glassboro, Grenloch, Pancoast, Penbryn, Pine Valley, Radix, Richland, Robanna, Williamstown and Williamstown Junction, N. J., to Philadelphia, Pa. (Rates in cents per 2000 lb.) Proposed, A, 105c; B, 115c.

Reason—The purpose of this proposal is to bring about a better alignment in the rates than now exists. File 43312.

14104. (a) **Crushed stone,** carloads; (b) crushed stone, coated with oil, tar or asphaltum, carloads, from White Haven, Penn., to Dornsife, Penn., (a) $1.60 per 2000 lb., and (b) $1.70 per 2000 lb. File 42195.

14108. (a) **Building lime,** carloads, minimum weight 30,000 lb.; (b) agricultural land, chemical, gas, glass lime, carloads, minimum weight 30,000 lb., and ground limestone, carloads, minimum weight 50,000 lb., from Bainbridge, Penn., and Reems, Penn., to Malone, N. Y. (a) 28c per 100 lb., and (b) 27c per 100 lb. Subject to Rule 77.

Reason—To establish rates which will be comparable with those in force from other limestone shipping points to the same destination. File 43377.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

11135. **Lime,** minimum weight 40,000 lb., from Winooski, Fonda Jct., Scranton and Highgate Springs, Vt., to Delano Jct., N. Y., 14½c. Reason—Necessary to be on comparable basis with rate of 17c to Albany, N. Y., in C. V. Ry. I. C. C. A6016.

11140. **Sand,** molding, minimum weight 90% of marked capacity of car, except when loaded to cubical or visible capacity actual weight will apply, from Brookview, Niverville and Van Hoesen, N. Y., to Marathon, N. Y., 11c. Reason—To establish same rates from B. & A. R. R. shipping stations as authorized from the capital district.

ILLINOIS FREIGHT ASSOCIATION DOCKET

1526-K. **Crushed stone,** carloads, minimum weight marked capacity of car, from Anna, Ill., to Conants, Cutler, Percy and Steelville, Ill. Rates in cents per net ton: present, combination rates; proposed, 84c.

Agricultural Lime Rates Not Excessive

THE Interstate Commerce Commission, by division 3, has dismissed No. 17313, Frank P. Case & Sons et al. vs. Pennsylvania (mimeographed), finding that a rate of $3.20 per net ton on agricultural lime, from Buffalo, N. Y., to Troy and Canton, Penn., is not unreasonable or otherwise unlawful. The complaint, filed by dealers in agricultural lime and ground limestone, alleged the rate unreasonable, unjustly discriminatory and unduly prejudicial to the extent it exceeded or may exceed $1.70. The complainant mentioned the commodity shipped as ground limestone. The report said it was agricultural lime, but that the variance was of no significance in this case because the Pennsylvania published the same rate on the two commodities.

Complainants contended there was undue prejudice because of a lower rate of $1.70 from Buffalo to Oswego and Binghamton and other destinations. The commission said the Pennsylvania, the only carrier named, did not serve the towns mentioned as being unduly preferred nor join in rates to these points on lime or limestone. It said the competition met by the complainants was at Towanda, Powell, Milan, Ulster, Seeley Creek and Mansfield, Penn., and that it was well established that undue prejudice or preference did not exist as between shippers or communities unless the same carrier or carriers served them or participated in their traffic. The Pennsylvania said that for it to make rates as low as $1.70 would cause undue prejudice to shippers of limestone at other points on its rails. It also pointed out that under the Mitchell scale prescribed in Lehigh Lime Co. vs. Akron, Canton & Youngstown, 85 I. C. C. 341, the rates would be $3.20 and $3.30, from Buffalo to Canton and Troy, respectively.

Reparation Awarded on Lime Rates

APPLYING the rule for the construction of tariffs laid down in the Sligo Iron Store case, 62 I. C. C. 643, the Interstate Commerce Commission, in No. 17051, Traffic Bureau of Knoxville et al. vs. Southern et al., mimeographed, found the rates charged on lime, from Knoxville, Tenn., to Braithwaite, La., in 1924 and 1925, inapplicable and awarded reparation. The commission, by division 4, said a rate amounting to $4.33 per ton was collected. It was made up of a rate of $2.93 per ton from Knoxville to New Orleans, plus 7 cents per 100 lb. beyond. The tariff publishing the rate of $2.93, the report said, was subject to the Jones combination rule. There was no reference in the tariff providing the 7-cent rate to the Jones rule. Applying the Sligo rule, the commission said the applicable rate was $3.93 per ton made up of the $2.93 factor to New Orleans, plus 7 cents per 100 lb. and minus 40 cents per ton. It awarded reparation to the Knoxville Sand and Lime Co., the consignor, on 14 carloads.

Sand and Gravel Rates Unreasonable

A FINDING of unreasonableness, an award of reparation and an order for the future have been made in No. 17112, Good Construction Co. et al. vs. Norfolk & Western, mimeographed, as to a rate of $1.51 imposed on 94 shipments of sand and gravel within the statutory period from Portsmouth, O., to Williamson, W. Va. The commission, by division 4, has found the rate unreasonable to the extent it exceeded, exceeds or may exceed $1.39 per net ton. The new rate is to be established not later than November 30.

Commissioner Woodlock dissented but did not set forth reasons for his failure to go with his colleagues.

Manufacturers Division of National Crushed Stone Association Plans for 1927 Exhibit at Detroit

THE annual pre-convention dinner meeting of the Manufacturers' Division of the National Crushed Stone Association, held at the Hotel Commodore, New York city, on Friday, October 15, was attended by fifty-one prospective exhibitors and members of the executive committee of the association.

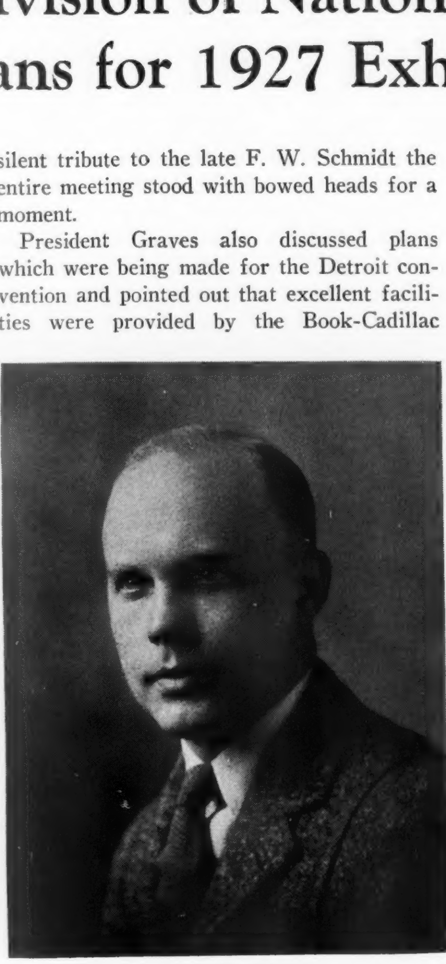
Exhibits of the Manufacturers' Division at the tenth annual convention of the National Crushed Stone Association to be held at the Book-Cadillac hotel, Detroit, Mich., January 17-20, 1927, will be on the same floor and adjacent to the convention hall. There will be seventy-one booths, which are to be rented at $35 each, which includes everything in the way of building the booth and decorating it. Prospective exhibitors will receive applications for space with floor plan and full details in a few days, mailed from the Washington office of the association. This year the center aisle booths will be kept clear at the back by having lower back partitions.

M. B. Garber, chairman of the Manufacturers' Division, presided at the meeting, which was informal and given up to practical discussions of exhibit features. It was also decided that on Tuesday, the second day of the convention, the Manufacturers' Division have their luncheon with the superintendents and operating men and that the program for the remainder of the day be turned over to them. A motion was passed that the chairman (M. B. Garber) appoint a committee to arrange for the Manufacturers' Division part of the program for their joint meeting with the superintendents and operating men. This committee is to consist of four (the editors of ROCK PRODUCTS, *Pit and Quarry, Cement Mill and Quarry,* and the Keystone catalogs). The type of program is to be decided by this committee but it was suggested that it consist of questions and problems that the operating men would like to have answered.

The U. S. Bureau of Mines and the National Safety Council were invited to exhibit at the convention.

O. M. Graves, president of the National Association, sketched briefly the history of the Manufacturers' Division, pointing out its phenomenal growth from its first meeting five years ago, with about 10 present, to the present meeting, with over fifty in attendance, and emphasized the spirit of helpfulness and co-operation which has always marked the relations between the active and associate members of this association. He spoke of one who was always eager to make unstinting sacrifice of his time and energy in the interests of this association and who we deeply regret is no longer with us. In silent tribute to the late F. W. Schmidt the entire meeting stood with bowed heads for a moment.

President Graves also discussed plans which were being made for the Detroit convention and pointed out that excellent facilities were provided by the Book-Cadillac hotel, it being possible to confine all of the activities of the convention, including the Manufacturers' Division exhibition, to one floor.



M. B. Garber

President Graves was followed by short addresses from Mr. Goldbeck, director of the Bureau of Engineering of the National Association; Dr. Bowles and Mr. Adams of the United States Bureau of Mines, and Messrs. Rice, Krause, Eames, Savage, Sporborg and F. W. Schmidt, Jr.

Mr. Greensfelder, chairman of the newly appointed committee on welfare and safety, was then called upon and briefly outlined the procedure to be followed by his committee.

Mr. Boyd, secretary of the National Association, discussed the details of the Detroit convention with particular reference to the Manufacturers' Division exhibition. He stated that full particulars relative to the exhibit would shortly be mailed to all associate members and closed his remarks with an urgent appeal for all members to act promptly, as soon as they were in receipt of the application blanks for booth space.

The remainder of the evening was devoted to perfecting plans for the Manufacturers' Division exhibition at the annual convention of the association in Detroit on January 17, 18, 19 and 20, 1927, after which the meeting was adjourned.

Executive Committee Meeting

The executive committee of the National Crushed Stone Association held its regular pre-convention meeting in New York City at the Commodore hotel on Friday, October 15.

The following members of the executive committee and guests were present: O. M. Graves, H. E. Bair, J. R. Boyd, W. Scott Eames, A. T. Goldbeck, F. R. Kanengeiser, E. J. Krause, John Rice and W. L. Sporborg.

The meeting was largely devoted to a discussion of the plans for the Detroit convention, which are rapidly being perfected and give promise of producing the most successful convention in the history of the association.

Committee on Welfare and Safety Meets

At the call of Chairman Greensfelder the newly organized committee on welfare and safety of the National Crushed Stone Association held its first meeting at the Commodore hotel, New York City, on Friday, October 15, at 4 P. M.

The following members of the committee were present: N. S. Greensfelder, Oliver Bowles and W. W. Adams, co-operating members from the U. S. Bureau of Mines, J. H. Heimlick, D. C. Souder, John Rice, Jr., and J. R. Boyd. There were also in attendance O. M. Graves, president of the National Association A. T. Goldbeck, director of the Bureau of Engineering of the National Association, and John Rice, member of the board of directors of the National Association.

The meeting was called for the purpose of planning a campaign of action for promoting welfare and safety in the crushed stone industry.

After briefly outlining the proposed work of the committee Chairman Greensfelder called upon W. W. Adams of the statistical division of the U. S. Bureau of Mines in Washington, who offered the fullest possible co-operation of the Bureau of Mines in furthering this most important work.

Oliver Bowles, of the non-metallic station of the U. S. Bureau of Mines at New Brunswick, N. J., was then called upon and gave the committee many valuable suggestions.

D. C. Souder also gave the committee the benefit of his experiences in safety work with the France Stone Co.

After pro and con discussion the meeting adjourned with the feeling that excellent progress had been made and that very definite recommendations could be made on this

subject to the Detroit convention in January.

Following is a complete list of the registration of the dinner-meeting:

M. B. Garber, Sanderson-Cyclone Drill Co., Orrville, Ohio.
Otho M. Graves, president, National Crushed Stone Association, Easton, Penn.
W. Scott Eames, New Haven Trap Rock Co., New Haven, Conn.
Gordon Buchanan, C. G. Buchanan Co., New York City.
L. W. Shugg, General Electric Co., Schenectady, N. Y.
S. R. Russell, E. I. DuPont de Nemours Co., Wilmington, Del.
J. B. Crew, Marion Steam Shovel Co., Marion, Ohio.
Arthur F. King, Marion Steam Shovel Co., Marion, Ohio.
Wm. Blade, American Manganese Steel Co., Chicago Heights, Ill.
A. E. Holcomb, Koehring Co., Milwaukee, Wis.
W. O. Weil, W. S. Tyler Co., Cleveland, Ohio.
Albert S. Reed, W. S. Tyler Co., Cleveland, Ohio.
Chas. W. Price, Cement, Mill and Quarry, New York City.
F. K. Armstrong, Ingersoll-Rand Co., New York City.
J. W. Moreton, Ingersoll-Rand Co., New York City.
T. E. Fisher, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
J. K. Brandon, Ensign-Bickford Co., Simsbury, Conn.
W. M. Annette, Hercules Powder Co., Wilmington, Del.
R. Grubb, Canadian Explosives, Ltd., Montreal, Canada.
F. R. Kanengeiser, Bessemer Limestone and Cement Co., Pittsburgh, Penn.
Oliver Bowles, U. S. Bureau of Mines, New Brunswick, N. J.
W. W. Adams, U. S. Bureau of Mines, Washington, D. C.
N. S. Greensfelder, Hercules Powder Co., Wilmington, Del.
S. F. Cole, Pit and Quarry, New York City.
E. G. Lewis, Bucyrus Co., New York City.
C. W. Flounders, C. G. Buchanan Co., New York City.
L. D. Hudson, Symons Bros. Co., Milwaukee, Wis.
John Rice, General Crushed Stone Co., Easton, Penn.
E. J. Krause, Columbia Quarry Co., St. Louis, Mo.
E. H. Paull, Ingersoll-Rand Co., New York City.
R. C. Sullivan, ROCK PRODUCTS, New York City.
D. C. Souder, France Stone Co., Toledo, Ohio.
Williard Young, Atlas Powder Co., Wilmington, Del.
A. T. Goldbeck, National Crushed Stone Association, Washington, D. C.
B. F. Damon, Cement, Mill and Quarry, New York City.
B. G. Dann, Hendrick Mfg. Co., Carbondale, Penn.
S. F. Macpeak, Earle C. Bacon, Inc., New York City.
James Savage, Buffalo Crushed Stone Co., Buffalo, N. Y.
F. W. Schmidt, Jr., Morris County Crushed Stone Co., Morristown, N. J.
Fred A. Gill, Gill Rock Drill Co., Lebanon, Penn.
R. A. Wholley, Blaw-Knox Co., Pittsburgh, Penn.
Thos. Robins, Jr., Robins Conveying Belt Co., New York City.
John Rice, Jr., General Crushed Stone Co, Easton, Penn.
J. C. Farrell, Easton Car and Construction Co., Easton, Penn.
H. M. Davison, the Hayward Co., New York City.
Judson Hayward, the Hayward Co., New York City.
C. B. Andrews, Taylor Wharton Iron & Steel Co, High Bridge, N. J.
J. C. Houston, Browning Crane Co., Cleveland, Ohio.
John C. Taylor, Taylor Wharton Iron and Steel Co., High Bridge, N. J.
W. L. Sporborg, Rock-Cut Stone Co., Syracuse, N. Y.

New Rock Plant To Be Built in Williston, Fla.

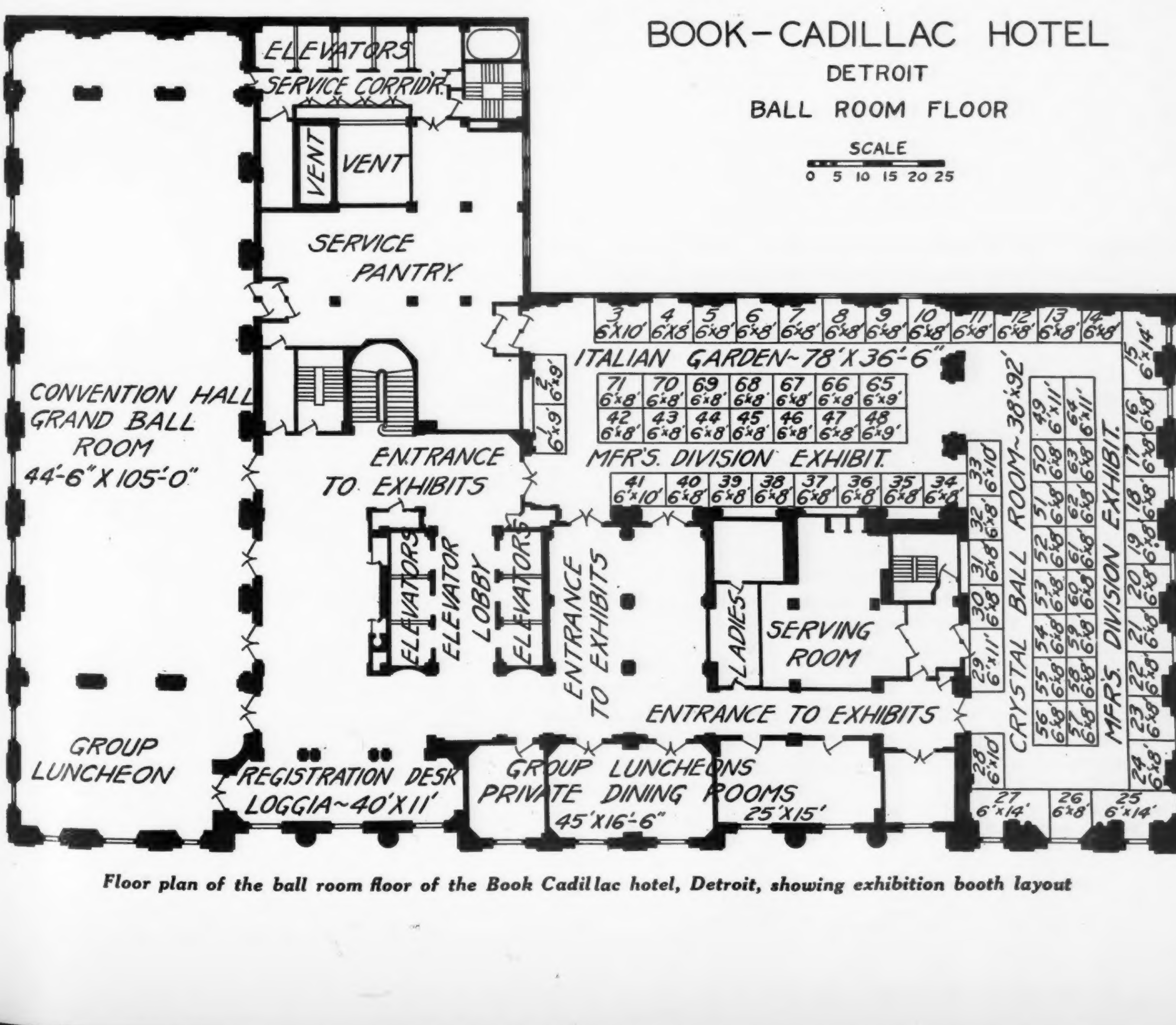
CONNELL AND SCHULTZ, who are operating a rock plant at Williston, Fla., are building a new and larger plant in another section of the city, according to the Gainesville (Fla.) *Sun*.

This plant when completed will represent an expenditure of approximately $75,000. It will have a capacity of 40 cars daily and will have two double-track inclines with four drums. Several shovels will be operated.

NATIONAL CRUSHED STONE ASSOCIATION

TENTH ANNUAL CONVENTION

JANUARY 17~20, 1927



Floor plan of the ball room floor of the Book Cadillac hotel, Detroit, showing exhibition booth layout

Cement and Quarry Operating Men Discuss Safety and Welfare

Interesting and Helpful Discussions at Detroit Convention of the National Safety Council—Quarry Operators Scored for Negligence in Safety Work

PROBABLY an outstanding paper, of interest to *all* quarry operating men, whether they quarry stone for cement, lime or commercial crushed stone, was that read at the cement mill and quarry sectional meeting of the National Safety Council at Detroit on October 27 by Dr. R. H. Lansburgh, secretary of labor and industry, of the State of Pennsylvania. Dr. Lansburgh has recently completed a thorough-going study of quarry accidents in Pennsylvania, which has resulted in a state quarry operating code, which has all the force of law in Pennsylvania.

It is believed that this quarry operating code is but the forerunner of many that other states will adopt with this as a model, so that its significance to the quarry industries is very considerable. At the present time there is considerable agitation in Ohio to adopt a similar code. Some states, such as New York and Wisconsin, have had quarry operation regulated by similar codes for several years, but this Pennsylvania code probably represents as thorough a study of the problem as has ever been attempted.

Prefacing his paper, Dr. Lansburgh said that this investigation had developed one very fundamental and all important fact: That there is no other industry where safety organization is more important than the quarry industry; and that with the exception of the quarries in the cement industry there is no industry which is as little organized for effective safety work as is the quarry industry today.

Dr. Lansburgh's Address

"The cement industry is the most nearly completely organized for safety of any in the United States. The closely knit organization which you have developed exists not only throughout the cement plants themselves, but into the quarries in connection therewith. The quarry industry, other than that portion of it which is connected with the cement plants and certain outstanding large operators probably here represented, is almost totally unorganized for safety. This condition represents a challenge to those of you interested in quarry safety, particularly because of the extremely hazardous nature of the quarry industry and the fact that a very large majority of its accidents are of the type which can only be reached through effective safety work.

"There is probably no other industry in the country where such a large percentage of accidents arise from non-machine causes, or where safety practices, as developed from experience within the industry, bear such an important relation to accident reduction.

"Five causes stand out prominently as representing about 75% of all accidents in the quarries of Pennsylvania. The statistics of the United States Bureau of Mines indicate similar conditions throughout the United States. The five causes are as follows:

"1. Explosives and explosions.
"2. Cars and engines.
"3. Falling objects.
"4. Falls of persons.
"5. Handling materials.

Explosives and Explosions

"The first cause is one which to consider brings with it endless discussion of the handling and use of dynamite. Experts claim dynamite cannot prematurely explode, but accident reports show continually from one to six persons injured by premature explosion of dynamite. Examples of accident reports are as follows: 'Man preparing to charge a hole, the dynamite exploded and killed one man and injured four others.' Another, 'Men were charging a hole in the quarry, the dynamite exploded injuring four men.' In the first instance, the man who prepared the charge should not have been permitted to carry the charge into the body of men working on the bank. Only the person necessary to place the charge should have been permitted to handle it or be near it. He should not have been permitted to create an unnecessary hazard which did not in any way assist in the carrying on of the work. In the second case, when charging holes for blasting, seldom if ever is it necessary to have more than two persons, and in many instances only one person is necessary to prepare the blast. In every instance the number of persons handling the charging always should be kept down to the minimum because of the danger of premature explosion.

"Another type of accident report reads: 'Two charges of dynamite had been placed, both charges being connected with the switchboard. After the charge had been set off these six men returned to the place to work, when suddenly one charge which had failed to go off discharged, injuring all six men.' In this case after the charge had been set off only the person in charge of the blasting should have been permitted to return to the working place, and he should have made a thorough and complete inspection of the cause of the second charge failing to fire before permitting the other five men to return.

Cars and Engines

"This class of accidents in general are caused by lack of supervision and a disregard for the well-known safety practices. Oil and gas engines operated in quarries where artificial light is seldom used should not show such a heavy toll of human life or such a large number of non-fatal accidents.

"Tom Smith was riding on the trip. He cut the engine loose and fell under the trip. Death resulted two hours later. He should not have been permitted to ride on a loaded trip. If he was the conductor, he should have ridden on the engine and not on the trip. If the track had been properly graded it would not have been necessary to make a flying switch, which evidently caused this accident. Flying switches can be entirely eliminated by proper grading of the track, which can be done in most quarries at very little expense.

"John Brown was assisting the work to replace a car on the track when the engineer started the engine, throwing Brown under the car. A fracture of the left leg and fracture and laceration of the right leg resulted. If the foreman or other person in charge of retracking the car had been a real safety man, he would not have permitted the engineer to move the engine until he was certain that every person assisting in the retracking was out of the danger zone.

"Jim Green was loading a car when the car upset, pinning him underneath, which resulted in a compound fracture of the left leg. This case illustrates clearly the necessity of placing only competent persons in charge of quarry operations. It seems impossible to believe that a foreman or other person having charge of a quarry failed to see that the load was so heavy on one side that a car would topple over and injure the workmen. Proper supervision could and will prevent such accidents.

"Accidents due to falling objects are principally caused by falls of material and clearly

illustrate the necessity for careful inspection of the working face. Too much emphasis cannot be placed upon face inspection, as the following accident reports show: 'While employe was loading shale into a car a piece of shale fell from above, striking him on the head, causing a fracture of the skull. Death resulted 10 days later.'

"'Employe was repairing channelling machine. A piece of stone fell striking him on the head, causing instant death.'

"'Employe was charging a hole for a blast when a stone fell from above, fracturing his right arm.'

"'Employe was barring stone when a loose stone fell from above, fracturing his left foot.'

"'While loading shale, a piece fell from the face and employe suffered a bad contusion of the left leg.'

"Such reports are received by us daily from the quarries of Pennsylvania and illustrate the necessity not only for daily inspection but constant inspection of the working face. If the foreman cannot find time, the plant must provide for inspection by a competent person during the time when men are loading and before men are permitted to commence drilling. Face inspection is one of the most important means of reducing accidents.

Falls of Persons

"The nature of quarry work requires men to be at the face during almost every hour of the day, and they are here constantly in danger from slides and falls. The use of life lines and belts is the greatest safety factor for men employed in this class of work.

"To illustrate the necessity for life lines and belts in such operations the following accidents are available: 'Employe was working at the top of the quarry, his foot slipped, causing him to fall 40 ft. into the quarry. Death followed a few minutes later.'

"'Employe was barring stone from face when another stone fell from above, causing him to lose his balance. He fell into the pit below and received injuries which caused his death the following day.'

"'Employe barring stone from ledge 15 ft. above the quarry floor when his pick slipped, causing him to lose his balance, falling into the quarry and resulting in serious injuries.'

"'Man was barring stone when a piece of stone struck him, knocking him from the ledge. He fell 8 ft. into the pit and death resulted from the injuries.'

"This is sufficient evidence of the need of life lines and belts in quarry operations. While the use of these devices would not have prevented these accidents, I am positive they would have prevented loss of life in the three fatal cases cited.

Handling Materials

"Handling materials stands out very conspicuously among the accidents in quarry operations. During the first six months of 1926, 15% of all accidents in the quarries of Pennsylvania is charged to this cause. Broken bones, mashed fingers and injured hands and feet result from the careless handling of material. Failure to use goggles when loading and breaking stone is responsible for many of the accidents charged here. The following type of accident reports are commonplace:

"'Man was loading stone when a piece of stone flew from the hammer of another employe, striking him in the eye.' 'Employe was breaking stone with a hammer when a piece of stone hit him in the eye.' 'While loading stone, a fellow employe pulled down some loose stone and before injured man could get out of danger his foot was mashed.' 'Fellow employe was pulling rock down from ledge when it broke, rolled down and crushed injured man's leg.'

"This type of accident clearly indicates the lack of safety spirit caused by lack of the proper safety organization, and it is evident that a campaign of education among foremen, as well as employes, is necessary to reduce this type of accident, as well as the other types which have been discussed.

"The interesting fact about a large percentage of quarry accidents is that there are no complicated engineering problems involved in their prevention. Accidents from machinery are relatively few.

"The present accident situation in the quarry industry in the United States represents a challenge to you who are interested particularly in quarry safety to stimulate the interest of that great mass of quarry operators who, as yet, have paid but little attention to that element in our daily industrial life which we have all come to Detroit to discuss—safety."

Cement Mill Session

The cement mill session on Tuesday, October 26, was attended by about 100 representatives of cement mills from the Atlantic to the Pacific coasts. R. Frame, chairman, insurance manager of the Alpha Portland Cement Co., Easton, Penn., introduced the representatives of the several companies which have won the Portland Cement Association trophies for no-accident records. Each told what it meant to have one of these trophies and the pride of the men and town's-people in explaining to visitors what it meant.

Maj. Henry A. Reninger, vice-president of the National Safety Council, who is in charge of accident prevention work for the Lehigh Portland Cement Co., introduced G. S. Brown, president of the Alpha Portland Cement Co. Mr. Brown said that he first became actively interested in accident prevention about 1910 when the first employers' liability laws were being discussed by the New York and New Jersey state legislatures. From that time every effort had been made to reduce accidents in the Alpha plants. He said he had "finally come to see that no effort we can make to prevent the killing and maiming of workmen was too great or too costly to be tried."

Mr. Brown was a member of the first accident prevention committee of the Portland Cement Association and has had an active interest in this work of the association ever since.

In discussing the progress of the Alpha company in accident prevention, Mr. Brown emphasized the great difficulty in keeping up an active interest on the part of employes. At first it had been regarded largely as a problem of guarding machinery, but it was soon found to be more a problem of educating men against carelessness. But the real problem was to get the co-operation of the men themselves, and results were often discouraging.

Bonus System

Mr. Brown then described briefly a bonus system, adopted this year by his company. Under this scheme all the employes of a plant which goes for one month without an accident are entitled to a 1% increase in their weekly pay. This percentage increase continues to be given month after month until the plant is disqualified by a lost-time accident. The 1% bonus is then lost until the plant has another clean month's record to start with. The 1% bonus is added to every employe's pay, from the superintendent down, including the chemist and office help.

The amount involved is not large, for example, a man earning $150 a month gets a bonus of only $1.50 a month—but it is not the amount that counts; it is, Mr. Brown said, the concrete evidence that the management of the company is sufficiently interested in accident prevention to pay money for that purpose. Then there is also the human element of pride which will keep a man from taking chances, or taking time off on account of a minor injury, unnecessarily knowing that by doing so he is jeopardizing the bonus of every other employe of the plant. The attitude of the management, he said, determines the attitude of employes.

Mr. Frame estimated that these 1% bonuses to the 10 plants of the Alpha company, which are working under this scheme, have cost the company to date about $9000 and the estimated yearly cost is about $16,000. One after another of the Alpha men got on his feet and endorsed the success of the bonus plan. In subsequent discussions some of the cement mill men were inclined to look upon bonus schemes as a form of bribery to keep men from taking chances; but the evidence submitted did not by any means bear up this point of view.

Other cement companies, it was brought out in the discussion, have somewhat similar bonus plans. The International divides its plants into groups along certain dividing lines, and each year that one of these groups goes without an accident entitles all the employes in this group of plants to a yearly bonus of $10 each. This bonus is increased $10 each year that the no-accident record is maintained until the bonus is a total of $50.

Whenever an accident occurs the plants in that group start back again on the original basis, so that there is a continued stimulation to keep up the good record made in any one year. The Ash Grove Lime and Portland Cement Co. also has a bonus system for accident prevention.

Questioned as to the possibility of combining production and accident prevention bonuses, Mr. Brown said he did not see how this could be done. He said he could not see how he could fairly penalize a plant for delays and loss of production due to climatic conditions or breakdowns beyond the power of the men to prevent. He did not look on the accident prevention bonus as a bonus, but merely as evidence that the management was sincerely interested in accident prevention.

Physical Examination of Employes

The subject which presented the most food for thought, and which proved to be most interesting was: "The Relationship Between the Physical Examination and Accident Prevention," by Eugene T. Green, insurance and personnel department, Riverside Portland Cement Co., Los Angeles, Calif. This company is proceeding on the theory that its personnel is just as important a factor in production as the machinery, and that it pays to keep its personnel as well as its machinery in prime condition, if possible. And it has been clearly demonstrated that there is a very direct and tangible relation between the physically unfit and fatal and lost-time accidents.

Mr. Green gave a number of instances where employes had died of heart failure just after leaving the job, or on the job, where under slightly different circumstances their deaths would unquestionably have been rated as industrial accidents, such, for example, had they fallen into machinery in motion instead of falling to the floor.

Physical examinations are now made by two medical specialists of every applicant for employment, and all employes are regularly examined once a year. The physicians are in the employ of the company, and devote practically their whole time to the company's work. The men are examined in alphabetical order during the year. The examinations are very thorough, including a Wasserman blood test. The men, having found out that it is for their own advantage, have co-operated splendidly.

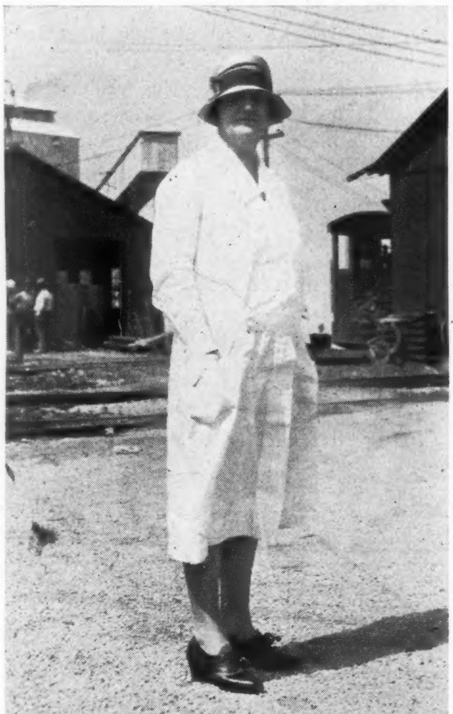
It had to be made plain to the men that physical defects found in them were not to deprive them of employment, but the information was merely to help place them in positions where their own lives and their fellow workmen's lives would not be endangered. For example, men suffering from hernia were not put in jobs where they would have to do heavy lifting, or were given helpers to do the lifting. Over 15% of the employes were found to have hernias, and over 50% potential hernias. It was really a godsend to these men to tell them of the dangers they could avoid. Men with such defects were advised to have operations and the expense of the operations and the time lost is borne largely by the company. In 600 employes, there were 2600 physical defects, or an average of four such defects per man. There was a wide tendency to throat troubles and pyorrhea. Tonsil infection was also common and operations advised. About 10% were found to give positive Wasserman tests.

Mr. Green concluded, quite logically, that the time would come when industry could well put a premium, or a high value, on physical fitness, just as it does today on intellect.

There were many other interesting discussions, which we shall have to leave for a later issue.

Welfare Work in Quarries

A FINE example of what can be done in profitable welfare work in the rock products industry can be seen at Hillsville, Penn., where the Lake Erie and the G. W. Johnson Limestone Co.s have engaged in the work.



Miss Maud E. Keyser, community nurse and welfare worker at the plants of the Lake Erie and G. W. Johnson limestone companies

Six years ago these two companies jointly employed Miss Maud E. Keyser, a registered trained nurse, who had had a few years experience in community-welfare work with the Carnegie Steel Co. at New Castle, Penn. She was engaged as a nurse, but it was not long until her activities expanded to include every possible kind of welfare work for the benefit of the companies' employes and their families.

Today her work consists of helping the sick; helping in boy-scout work; conducting classes in first-aid; conducting classes in sewing for both children and adults. This work is all in addition to her duties as nurse, in charge of both companies' plant hospitals.

Playgrounds for the employes' children have been built by the companies at her instigation and each year she arranges community picnics which are attended by from 2000 to 3000 people. In addition to this, she arranges various kinds of interesting contests, such as baby shows, food shows, etc. In fact, anything and everything is done by her and her organization that tends to interest and keep happy the companies' employes and their families.

The result of this work is that these two stone producers have good, satisfied, reliable and steady men. It is seldom that an employe leaves of his own accord, although they receive no higher wages than they would receive elsewhere.

The least ROCK PRODUCTS can say about this kind of work is that it is most commendable and we hope we will soon learn of its application at many more plants.

Potash Exploration Area Selected

THE area officially selected for the beginning of the federal government's effort to find domestic supplies of potash, which it is hoped may render the United States independent of foreign producers of this essential material, lies in the northwest corner of section 4, William Teer Survey, Upton County, Texas, and centers about the Dixie Hughes No. 1 oil well, it is announced by the Bureau of Mines of the Department of Commerce. This area, which has been recommended by the United States Geological Survey for potash exploration, is located in a territory now developing as an oil field, oil production being obtained at an average depth of 2000 ft. The depth to the top of the potash-bearing salts is 435 ft. The total depth recommended for test holes is 1300 ft. Mineralogical examination of a series of cuttings shows three horizons of excellent polyhalite. Any point within a radius of two miles from the Dixie Hughes No. 1 oil well is considered by the Geological Survey as favorable for potash exploration. Alternative sites for the drilling of test holes have been designated.

Under agreement between the Secretaries of the Interior and Commerce, the choice of the drilling sites for potash exploration, as authorized under the Act of Congress approved June 25, 1926, was left entirely to the Interior Department, the Bureau of Mines of the Commerce Department to assume charge of leasing arrangements and drilling operations after the site had been selected.

National Crushed Stone Officials to Make Transcontinental Trip

STARTING from Chicago on November 8, President Otho M. Graves, A. T. Goldbeck, chief of the bureau of engineering, and J. R. Boyd, secretary, of the National Crushed Stone Association, will make a trip in the interests of the association which will take them to the Pacific coast and back, with stops at many cities in between. They will be accompanied on this trip by Nathan C. Rockwood, editor-manager of ROCK PRODUCTS, who will report the meetings held; and for parts of the trip at least several of the directors of the association will be with the party.

Meetings will be held with local quarry operators and highway officials at Madison, Wis.; Omaha, Neb.; Cheyenne, Wyo.; Denver, Colo.; Salt Lake City, Utah; Portland, Ore.; San Francisco, Calif.; Los Angeles, Calif.; El Paso, Tex.; San Antonio, Tex.; New Orleans, La.; Atlanta, Ga., and Nashville, Tenn.

The objects of the trip are to bring the accomplishments and the plans of the National Crushed Stone Association to the attention of quarry operators throughout the western and southern parts of this country. There will be talks and discussions on all phases of quarry operation and management, and on the uses of crushed stone.

Every quarry operator in this great territory whom it has been possible to reach by mail and telegraph has been invited to attend one or more of these meetings; and whether he has received an invitation or not every reader of this article who operates a quarry is invited to attend herewith, by authority of President Graves and the local chairmen of the meetings. The list of meeting places and the local men in charge of the meetings are as follows:

Otho M. Graves

List of Meetings and Individuals in Charge of Them

Monday, November 8—Madison, Wis., meeting. A. J. Blair, vice-president Lake Shore Stone Co., 600 Canal street, Milwaukee, Wis.

Tuesday, November 9—St. Paul, Minneapolis meeting. John Wunder, John Wunder Co., Broadway and K streets, Minneapolis, Minn.

Wednesday, November 10—Omaha meeting. Thomas Sullivan, 1042 Omaha National Bank building, Omaha, Neb.

Thursday, November 11—Cheyenne, Wyo., meeting. C. J. Cunningham, S. Cunningham and Son, Horse Creek, Wyo.

Thursday, November 11—Denver, Colo., meeting. James Lawrence, Golden Basalt Products Co., Golden, Colo.

Saturday, November 13—Salt Lake City meeting. Eric Ryberg, Utah Sand and Gravel Products Corp., P. O. Box 1214, Salt Lake City, Utah.

Thursday, November 18—Portland meeting. Daniel Kern, president, Columbia Contract Co., 294 East Salmon street, Portland, Ore.

(Date between November 20 to 23, to be announced later.) San Francisco meeting. J. R. Wilson, president, Granite Rock Co., Watsonville, Calif.

(Date between November 24 and November 26, to be announced later.) Los Angeles meeting. Geo. A. Rogers, president, Union Rock Co., 1403 East 16th street, Los Angeles, Calif.

Monday, November 29—El Paso meeting. A. Courchene, president, El Paso Limestone Quarries, El Paso, Texas.

Tuesday, November 30—San Antonio meeting. R. J. Hank, secretary-manager, Southwestern Division of the National Crushed Stone Association, 310 Littlefield building, Austin, Texas.

Wednesday or Thursday, December 1 or 2—New Orleans meeting. I. L. Lyons, Jr., Southern Mineral Co., New Orleans, La.

New Company to Open Quarries at Salem, Ind.

THE Salem Lime and Stone Co., a new industry at Salem, Ind., and just incorporated, is making preparations for opening the new quarries at the earliest possible date. The first quarry will be opened on a 28-acre tract of stone land one mile west of Salem, and shipping facilities are being provided by the construction of a switch from the main line of the Monon railroad to the quarry. Building stone and commercial ground limestone will be included in the products, and kilns also will be erected for the production of lime.

The site of the quarry is near the big quarries which were in operation in that vicinity some fifty years ago, but which were abandoned when the expense of stripping became too great and stone lands were found near Bedford and Oolitic which could be operated on a more economical basis. Building stone of fine quality has been quarried near Salem.

The members of the new company include W. W. Hottel, William S. Cassada, Thomas Campbell, Thomas Cavanaugh, Edward Cavanaugh, Luther Brown and Scott Bellows. Mr. Hottel is president of the company. Both Mr. Cassada and Mr. Campbell are experienced in various phases of the stone industry.

Micolithic Company to Develop Texas Mica Deposits

AS soon as the railroad which the Micolithic Co. of Texas is constructing from Collado, Tex., to its mica deposits six miles away is finished, development of the property will be started on a large scale, it is stated. The mill that is being constructed at the mines will have a daily capacity of 1250 tons. The deposits of mica and its allied substances cover 840 acres and are in the form of hills which rise above the surface. It is estimated that the deposits contain 500,000 tons of sheet mica, 10,000,000 tons of microline potash feldspar and 2,500,000 tons of refractory substance.

These mineral deposits are peculiar in that, through errosion, little foreign substance has been left. Almost all of the boulders are of solid color and practically every color is found over the property except blue.

A bed of garnets has been uncovered on one hill, and two beautiful emeralds, which sold for $400 and $800, were found in another place. The company, however, will devote its mining to mica and the refractory materials.

Premature Blast Kills Quarry Superintendent

THOMAS R. WILSON, superintendent of the Southern Crushed Stone and Granite Co. quarries, about three miles from Trenton, S. C., was killed by a premature blast on the afternoon of October 8.

According to reports Mr. Wilson had placed explosives in four holes in preparation for a blast, lighting the last just before inserting it. Apparently the fuse burned too fast and the four charges of dynamite exploded before regular time. A negro workman standing near Mr. Wilson was knocked down and badly burned.

Mr. Wilson had been in the quarrying industry since a boy and had worked in various sections of the country. He is survived by a widow and three children.

Delaware Studies Concrete Aggregates

THE Delaware State Highway Department is engaged in research to determine the relative strengths of four kinds of crushed stone and of a number of different sands in concrete.—*Highway Research News.*

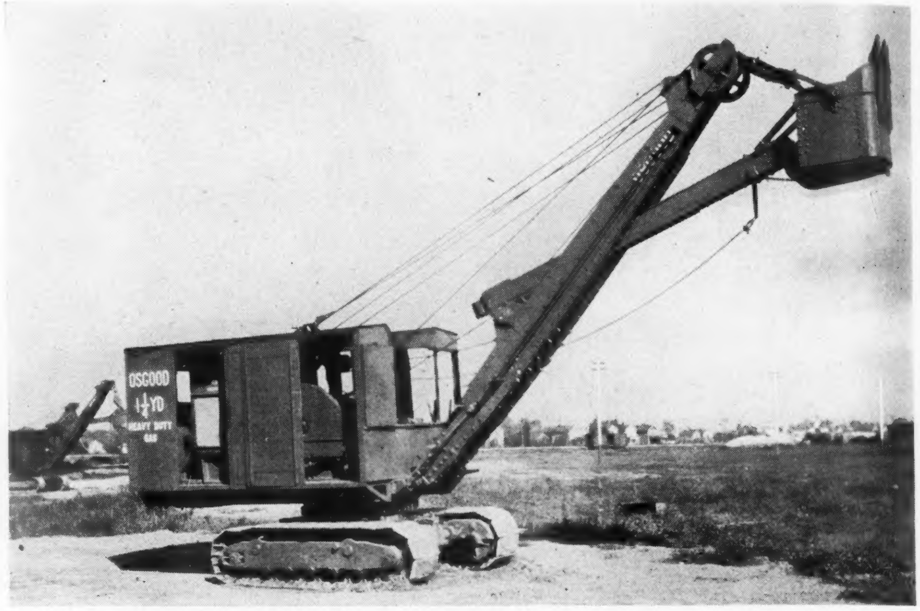
New Machinery and Equipment

New $1\frac{1}{4}$-Yard Shovel

A NEW shovel of $1\frac{1}{4}$ yd. capacity and driven by either gas or electricity is announced by the Osgood Co., Marion, Ohio. The design is such that it may be put in service as a crane with hook block and clamshell bucket and also as a dragline excavator without it is said, making any changes or additions to the operating machinery, save in the booms and buckets.

The machine is built for the greater part of open hearth and alloy steel castings. Four friction clutches are used in usual operation and these are of the outside contracting band type. Gearing is by plain spur gears. The standard mounting is an enclosed gear drive continuous tread truck, the chief features of which the manufacturers say are the large supporting area of the tread belts, steering from the upper body in any position with ability to turn gradually or on the machines own axis and an underside clearance of 12 in. Shovel crowding is accomplished by wire mechanism which is self-adjusting to all boom angles, the manufacturers say.

Other features claimed for the machine are the manganese front dipper; combination oak and steel boom and handle; "Special Osgood" 6 cylinder gasoline engine with accessories, including self-starter as standard; two-finger control of the drum clutches through the "Osgood Servo" mechanism; an all steel house with enclosed front and the combination cast iron gasoline tank and counterweight.



New 1 1/4-yd. shovel operating on gas or electric power

New 5-Ton Truck

THE Hug Co., Highland, Ill., announce as their latest addition to their line of Hug trucks the "HD6" with a rated maximum capacity of five tons. This is the largest size yet built by the company, the others being the "HA4" with a 2-yd. Hug cam roller gravity type body and the "H4K" of $3\frac{1}{2}$-ton capacity. One of the features claimed by the manufacturers is the speed performance, the maximum load, it is said, being carried with ease at 30 miles per hour.

The truck is equipped with a 6-cylinder Buda motor, Wisconsin double reduction rear axle of 7-ton capacity, Fuller 16 clutch and four-speed bus transmission system, Ross steering gear, Perfex radiator with heavy cast aluminum shell, large size core, Continental front axles and 38x7 tires in front and 38x7 duals in the rear. The dual tires are mounted on Hug adapters, which allow the use of dual tires on regular wheels. The adapter, it is said, is so designed that the center of the front tire is always kept in alignment with the center line of the two rear tires. Another feature, the makers say, is the Hug multi-cushion relax spring drive which is said to make it possible to drive through the spring without any damage to the spring and at the same time cushioning the working parts.

The manufacturers recommend the truck to those users who desire a heavy vehicle for multiple batch hauling with some of the speed performance of lighter trucks.


New and speedy 5-ton truck

New Refractory Cement and Suitable Gun

A REFRACTORY, plastic cement—called "Carboplastic"—has been introduced recently by the Carborundum Co. of Niagara Falls, N. Y. In addition, a new type of portable cement gun has been especially designed for its application. As the principal ingredient is carborundum, mixed with a suitable bonding material, a substance is obtained having the refractory properties of carborundum and the consistency of ordinary cement.

"Carboplastic" is used for locally coating fire brick—in other words, to protect fire brick against flame impingement and against the formation of cavities caused by cracking and spalling.

One of the feaures of the gun that will appeal to an operator is its lightness. It weighs but 12 lb. Furthermore, a single valve controls the flow of the cement; there are no other movable parts to the mechanism. Compressed air at a pressure of 100 lb. can be used to operate the gun, which has a capacity of about 100 lb. of "Carboplastic" per minute.—*Compressed Air Magazine.*

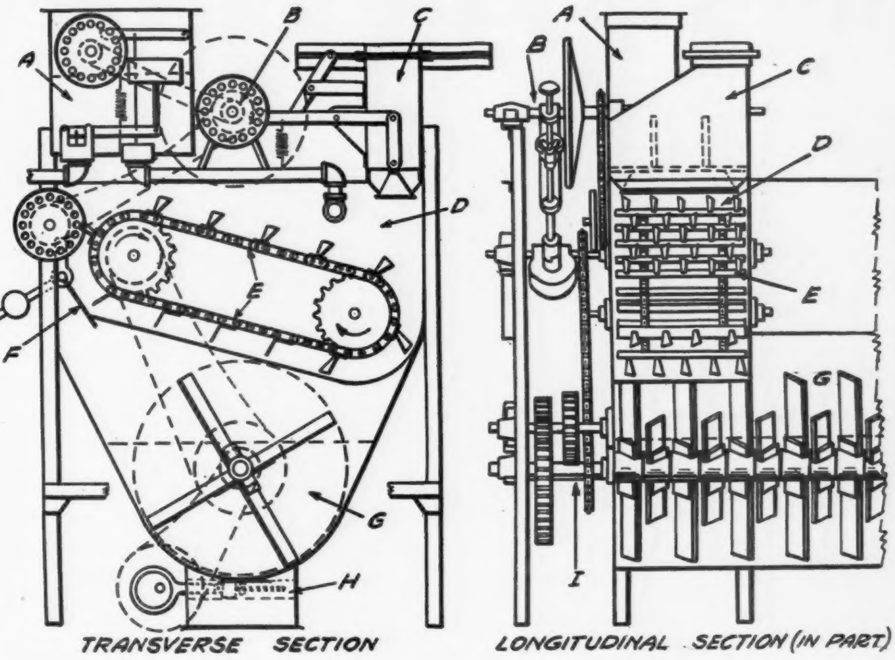
Automatic Batch Lime Hydrator

A NEW two-stage process of hydrating lime and automatic batch hydrator are announced by the Stewart W. Jameson Co., Duluth, Minn. The machine as developed by the manufacturers is said to have the following advantages: (1) Follows lump lime practice for quick slaking lime by adding the lime to the water; (2) prevents burning of hydrate; (3) separates perfectly hydrated from slow and non-hydrating material and reserves these for mason's hydrate; (4) baffled stack and tight casing collects most of the dust and (5) makes a more uniform product of greater plasticity.

The operation of the hydrator is as follows: Both water and lime are dropped in the lower end of the mixing chamber *D*. The measured amount of water coming from the automatic water tank *A* and the lime from the measuring bin *C*. The amount of time required in this chamber is regulated, it is said, for each particular lime. After the mixing is carried out, the batch is delivered into the finishing chamber *G* through the automatic dumping door *F* located at the top of the mixing chamber. Here the finished hydrate overflows adjustable baffles located at the end of the chamber. The slow and non-hydrating material are gradually fed into a reserve bin below the hydrator through the two-part outlet *H*. A jaw clutch permits the regulation of the discharge according to the run of lime. Each new incoming batch at the other end causes a little more of the completely hydrated lime to pass over. The slow hydrating lumps being heavier than the completely hydrated are thus held over until they are either completely hydrated and then pass over (this may require many batches) or are dumped through the feeder as reserve for mason's hydrate. Some cores will also be in the mass.

The entire machine is enclosed in a dust-tight casing. A stack with movable baffles collects some of the dust or very fine hydrate carried in suspension by the escaping steam and returns it to the finishing chamber. An operator is still needed to adjust the machine.

The automatic feeder, it is said, can be installed in many plants using the Clyde hydrators or other types by making a few changes.



Details of automatic batch lime hydrator

Electric Shovel with Air-Operated Hoist

AN electric shovel with air-operated hoist clutch, which is convertible to a crane, clamshell or dragline, has just been put on the market by the McMyler Interstate Co., Cleveland, Ohio.

The shovel handles a 1-yd. full manganese steel dipper which is driven by a single chain and sprocket crowd. A sprocket at the base of the boom drives the chain, enabling the boom angle to be changed without adjustment to the chain. A self-locking worm drives the boom hoist.

The chain crowd used on the electric shovel is said not only to eliminate crowding cable troubles and replacements and give positive crowding power, but also to enable the operator to shake the dipper without losing spotting accuracy. Air, which is compressed by the main motor, is piped from a storage tank and fed to the hoist clutch ram. This makes the hoist clutch operation identical to that of a steam shovel.

All operations of the shovel are entirely independent but are actuated by one 60-hp. motor. Power transmission is so arranged that the full power of the motor is available for any of the operations.

Electric shovel with air operated hoist

The shovel has a rotating speed of three revolutions per minute. Equipped with a 17 ft. 6 in. boom and 14 ft. 6 in. dipper stick, it has a rated maximum digging radius of 27 ft. 11 in., dumping radius of 25 ft. 5 in., digging height of 20 ft. 5 in., and dumping height of 19 ft. 6 in. Where extra high lift operations are to be required the shovel can be equipped with a longer boom and stick and a ¾-yd. dipper. The shovel may be mounted on crawler treads, tractor wheel or railroad car body.

Engineering Data on Roller Bearings

THE new Timken engineering journal, a loose-leaf book of 110 pages contains technical information relative to the application of Timken bearings to automotive and industrial machinery has just been issued. A number of pages are devoted to the explanation of the Timken bearing as manufactured at the present time. Features such as the positive alignment of the rolls, one-piece precision cage and special alloy steel are explained.

Typical problems, with the solutions, involving the calculation of various loads and the selection of suitable bearings are given. Tables showing bearing ratings, capacities and dimensions as well as speed capacity-curves are included.

Method of mounting Timken bearings, shaft and housing design, adjustment of Timken bearings, closures, cup and cone fitting practices, assembly methods and lubrication are treated in separate chapters.

A full set of dimension sheets accurately drawn to scale, together with formulas and recommendations for the application of Timken bearings, developed through experience gained in successful application comprise another section of the book.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	1.25	....
Danbury, Conn.	1.50@2.00	2.00	1.75	1.50	1.35	1.25
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Frederick, Md.	.50@ .75	1.20@1.30	1.15@1.25	1.10@1.15	1.10@1.15	1.05@1.10
Munns, N. Y.	....	1.00	1.50	1.50	1.25	1.25
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	....
Prospect, N. Y.	1.00	1.50	1.40	1.30	1.30	....
Walford, Penn.	.70	....	1.35h	....	....	....
Watertown, N. Y.	1.00	....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.	....	....	....	.50	1.50	1.50
Bloomville. Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.00	....	1.10	.90	.95	.95
Carey, Ohio	1.05	1.05	1.05	1.05	1.05	1.05
Chasco, Ill.	1.00@1.30	....	1.00@1.15	....	1.00@1.15	....
Columbia and Krause, Ill.	1.00@1.50	.90@1.10	1.20@1.35	1.00@1.20	.90@1.20	....
			Flux 1.50@1.75			
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Linwood, Iowa	1.10	....	1.30	1.10	1.15	1.15
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
Milltown, Ind.	....	90@1.10	.90@1.15	.90@1.00	.85@.90	.85@.90
River Rouge, Mich.	1.20	1.20	1.20	1.20	1.20	1.20
St. Vincent de Paul, Que.	.75	1.20@1.45	.90@1.15	.90@ .95	.85	.85
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Ont.	1.55	2.05	2.05	1.90	1.90	1.90
Stone City, Iowa	.75	....	†1.10	1.05	1.00	....
Waukesha, Wis.	1.10	....	.90	.90	.90	.90
SOUTHERN:						
Alderson, W. Va.	.50	1.35	1.35	1.25	1.20	1.15
Atlas, Ky.	....	1.00	1.00	1.00	1.00	1.00
Brooksville, Fla.	.75	....	2.65	2.65	2.40	2.00
Cartersville, Ga.	1.00	1.50	1.50	1.15	1.15	....
Chico, Tex.	1.00	1.35	1.25	1.20	1.10	1.00
El Paso, Tex.	1.00	1.00	1.00	1.00	....	....
Ft. Springs, W. Va.	.50	1.35	1.35	1.20	1.20	....
Graystone, Ala.			Crusher run, 1.00 per ton			
Kendrick and Santos, Fla.			3½ in. and less, 1.00 per ton			
New Braunfels, Tex.	.60	1.25	1.10	.90	.90	.90
Rocky Point, Va.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kans.	.25	1.90	1.90	1.90	1.90	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	....	1.25	1.25	1.10	....
Kansas City, Mo.	1.00	1.50	1.50	1.50	1.50	1.50
Rock Hill, St. Louis Co., Mo.	1.40	1.45	1.45	1.45	1.45	1.45

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.70	1.45	1.20	1.05	....
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	....	1.00	.90	.90	....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.55	1.25	1.15	1.15@1.50
New Haven, New Britain, Meriden and Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.40	1.40	1.60	1.40	1.40	....
Oakland and El Cerito, Cal.	1.00	1.00	1.00	.90	.90	....
San Diego, Calif.	....	2.75	2.55	2.35	2.35	....
Springfield, N. J.	1.70	2.10	2.10	1.70	1.60	....
Toronto, Ont.	....	3.58@4.05	3.05@3.80	....	....	....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	....
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.	.75	2.00	1.75	1.75	1.60	1.60
Eastern, Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1 20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.	.75	2.00b	1.75	1.40	1.40	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	....
Middlebrook, Mo.	3.00@3.50	....	2.00@2.25	2.00@2.25	....	1.25@3.00
Richmond, Calif.—Quartzite	.75	....	1.00	1.00	1.00	....
Somerset, Pa. (sand-rock)	1.85@2.00a	....	1.35@1.50	....	1.00@1.50	....
Toccoa, Ga.	....	1.35	....	1.30	1.30	1.25

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.10 (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40.

Agricultural Limestone

(Pulverized)

Alderson, W. Va.—50% thru 50 mesh	1.50
Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCo_3$; 90% thru 100 mesh	6.00
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis $CaCO_3$ 90.04%; $MgCO_3$ 1.5%, 100% thru 14 mesh, bags	4.50
Bulk	3.50
Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh	1.50
Blackwater, Mo.—100% thru 4 mesh	1.00
Brandon and Middlebury, Vt.—99% thru 70 mesh, burlap, 5.50; paper, 4.50; bulk	3.50
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; pulverized; 50% thru 50 mesh	1.50
Cartersville, Ga.—Pulverized, 2.00; 50% thru 50 mesh	1.50
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Texas.—50% thru 50 mesh, bulk	1,50
Colton, Calif.—Analysis 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Ft. Springs, W. Va.—50% thru 4 mesh	1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.25; bulk	2.75
Joliet, Ill.—90% thru 100-mesh	4.25
Knoxville, Tenn.—80% thru 200 mesh, 3.00; 80% thru 100 mesh, bags, 3.95; bulk	2.70
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@ 4.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—50% thru 50 mesh, 2.00; 90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis, $CaCO_3$, 95%; $MgCO_3$, 0.75%; 50% thru 100 mesh, burlap bags, 3.50; paper, 3.25; bulk	2.00
Syracuse, N. Y.—Analysis, 89% $CaCO_3$; $MgCO_3$, 4%; bags, 4.25; bulk	2.75
Toledo, Ohio, 30% through 50 mesh	2.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh, 2.10; 90% thru 50 mesh	1.65
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50
West Stockbridge, Mass.—Analysis 90% $CaCO_3$, 50% thru 100 mesh; cloth bags, 4.75; paper, 4.25; bulk	3.25

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—90% thru 4 mesh	1.00
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh	1.50
Brandon and Middlebury, Vt.—Pulverized, bags, 5.50; bulk	3.50

(Continued on next page)

Agricultural Limestone

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh		1.75
50% thru 4 mesh		1.50
Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh		.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh		1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh		1.35
Danbury, Conn.—Analysis, 81 to 85% $CaCO_3$	3.75@	4.75
Dundas, Ont.—Analysis, 53.8% $CaCO_3$; $MgCO_3$, 43.3%. 100% thru 10 mesh, 40% thru 50 mesh, 25% thru 100 mesh		1.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh		1.50
Kansas City, Mo.—50% thru 100 mesh		1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh		2.00
Screenings (¼ in. to dust)		1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk		1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$: 50% thru 50 mesh	1.85@	2.35
McCook, Ill.—90% thru 4 mesh		.90
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh		1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh		1.50
Monroe, Mich. — Analysis, $CaCO_3$, 52.03%; 42.25% $MgCO_3$; 30% thru 100 mesh		2.30
Mountville, Va. — Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh bags		5.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh		1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh		1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@	1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh		.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes		1.25

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk		3.00
Joliet, Ill.—90% thru 100 mesh		3.50
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@	3.50
Rocky Point, Va.—80% thru 200 mesh, bulk		3.00
Waukesha, Wis.—90% thru 100 mesh, bulk		4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.	2.00@	2.25
Buffalo, N. Y.	2.00@	2.50
Cedarville and S. Vineland, N. J.—Damp		1.75
Dry		2.25
Columbus, Ohio	1.00@	1.50
Estill Springs and Sewanee, Tenn.		1.50
Franklin, Penn.		2.00
Millville, N. J., and Klondike, Mo.	1.75@	2.25
Los Angeles, Calif.—Washed		5.00
Mapleton Depot, Penn.	2.00@	2.25
Massillon, Ohio		3.00
Mendota, Va.	2.25@	2.50
Mineral Ridge and Ohlton, Ohio		2.50
Oceanside, Calif.		3.00
Ottawa, Ill.	.75@	1.25
Pittsburgh, Penn.	3.00@	4.00
Ridgway, Penn.		2.50
Rockwood, Mich.	2.75@	3.25
Round Top, Md.		2.00
San Francisco, Calif.	4.00@	5.00
St. Louis, Mo.		2.00
Sewanee, Tenn.		1.50
Thayers, Penn.		2.50
Utica, Ill.		1.00
Zanesville, Ohio		2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.75@ 2.25
Columbus, Ohio		.30@ 1.50
Dresden, Ohio		1.00
Eau Claire, Wis.	4.25	.65@ 1.25
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.40	1.40			2.25	2.25
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		1.00*		1.50*	1.75*	
Farmingdale, N. J.		.48	.75	1.20	1.10	
Hartford, Conn.	.65*					
Leeds Junction, Me.		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75		.75	
Montoursville, Penn.		1.00	.75	.75	.75	.75
Northern New Jersey	.40@ .50	.40@ .50	1.25	1.25	1.25	
Olean, N. Y.		.75	.75		.75	
Portland, Me.	1.50	1.50	2.75		2.50	
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Penn.		1.85@2.00				
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.60@ .85	.60@ .85	1.70	1.50	1.30	1.30
York, Penn.	1.10	1.00				
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Appleton and Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Attica, Ind.			All sizes .75@.85			
Aurora, Oregon, Sheridan, Moronts, Yorkville, Ill.	.60	.50	.40	.50	.60	.55
Barton, Wis.		.75		.75	.75	.85
Chicago district, Ill.	.70	.55	.55	.60	.60	.60
Des Moines, Iowa		.40	1.50			
Eau Claire, Wis.	.65@1.25	.45	.80	.95	.95	
Elgin, Ill.		.20*	.50*	1.50*	1.50*	1.50*
Elkhart Lake, Wis.	.50	.40	.50	.50	.40	.40
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Grand Haven, Mich.		.60@ .70		.70@ .90		.70@ .90
Grand Rapids, Mich.		.50		.80	.80	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Humboldt, Iowa	.50	.50	1.50	1.50	1.50	1.50
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Joliet, Plainfield and Hammond, Ill.	.60	.50	.50	.60	.60	.60
Mason City, Iowa	.50	.50	1.45	1.45	1.35	1.35
Mattoon, Ill.	.75	.75	.75	.75	.75	.75
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.50	.50	1.50	1.25	1.25	
Pittsburgh, Penn.	1.25	1.25	.85	.85	.85	.85
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	.83	1.45	1.55	1.45	1.45	1.45
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.15	1.15
Zanesville, Ohio		.60	.50	.60	.80	
SOUTHERN:						
Charleston, W. Va.		All sand, 1.40.		All gravel, 1.50.		
Chattanooga, Tenn.		1.65			1.45	
Brewster, Fla.	.60	.60				
Chattahoochie River, Fla.		.70		1.75		
Eustis, Fla.		.60@ .70				
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.00
Lindsay, Texas					.55	
Macon, Ga.		.50			1.00	
New Martinsville, W. Va.	1.00	.90@1.00		1.20@1.30		.80@ .90
Roseland, La.	.50	.50	1.25	1.00	1.00	1.00
WESTERN:						
Kansas City, Mo.	1.00	.70				
Los Angeles district (bunkers)†	1.50	1.40	1.85	1.85	1.85	1.85
Oregon City, Ore.		1.50*	1.50*	1.50*	1.50*	1.50*
Phoenix, Ariz.	1.25*	1.25*	2.25@2.50*	2.00*	1.75*	1.50*
Pueblo, Colo.	.80	.60		1.20		1.30
San Diego, Calif.	.65@ .75	.65@ .75	1.50	1.30	1.10	1.10
Seattle, Wash. (bunkers)	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Burnside, Conn.			Sand, .75*			
Chicago district, Ill.	.35					
Ferrysburg, Mich.						.65@1.00
Gainesville, Texas						.55
Grand Haven, Mich.						.70@ .90
Grand Rapids, Mich.				.60		
Hersey, Mich.				.50		
Indianapolis, Ind.		Mixed gravel for concrete work, at .65				
Joliet, Plainfield and Hammond, Ill.	.35	1.25				
Lindsay, Texas						.55
Macon, Ga.	.40					
Mankato, Minn.			Pit run sand, .70			
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronts and Yorkville, Ill.			Ave. .60 per ton all sizes			
Somerset, Penn.		1.85@2.00		1.50@1.75		
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10	1.00				

(a) ⅝ in. down. (b) River run. (c) 2½ in. and less.
*Cubic yd. †Include freight and bunkerage charges and truck haul. ‡Delivered on job.
(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run. (f) plus 15c winter loading charge.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.25	2.00	2.25			3.50	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75	1.75		1.75	2.00		
Buffalo, N. Y.	1.50	1.50		2.00@2.50			
Columbus, Ohio	1.25@2.00	1.25@1.75	2.00@2.50	.30@1.50	2.00@2.50	2.75@3.50	1.50@3.00
Dresden, Ohio	1.40	1.50	1.50	1.25	1.50		
Eau Claire, Wis.						3.00	
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Elnora, N. Y.			1.75				
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	1.75	1.75	2.00	1.75			
Klondike, Mo.	1.75		1.75	1.75	1.75		1.75
Mapleton Depot, Pa.	2.00@2.25	2.00	2.25	2.00	2.00	2.00@2.25	
Massillon, Ohio	2.50			2.50	2.50		
Mendota, Va.	Ground flint or silex—16.00@20.00 per ton						
Michigan City, Ind.				.20@ .30	.30		
Millville, N. J.				1.75b		3.50	
Montoursville, P'n.				1.25@1.35			
New Lexington, O.	2.00	1.50					
Ohlton, Ohio	1.80b	1.80b		2.00b	1.80b	1.75b	
Ottawa, Ill.	2.50		2.50	1.25	.75	3.50	3.50
Ridgeway, Penn.	1.50	1.50					
Round Top, Md.	1.25			1.60		2.25	
San Francisco, Calif.	3.50	4.75	3.50	3.50@5.00	3.50@4.50	3.50@5.00	
Tamalco, Ill.		1.40@1.60					
Tamms, Ill.	Ground silica per ton in carloads—20.00@31.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.§	.50@1.00	.50@1.00		.50@1.00	.75@1.00		
Utica, Ill.	.50	.60	1.00	.60	.65	3.00@3.50	1.00@3.50
Utica, Penn.	1.75	1.75		2.00			
Zanesville, Ohio	2.00	1.50	2.00	2.00	2.00		

*Green. †Crude silica, crushed and screened, not washed or dried. ‡Plus 75c per ton for winter loading. ¶Crude. §Crude and dry. (a) Delivered. (b) Damp.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium and Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*		1.45*	1.45*	1.45*	
Jackson, Ohio		1.05*		1.30*	1.05*	1.30*	
Toledo, Ohio	1.50	1.35	1.35	1.35	1.35	1.35	1.35
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55*		1.55*	1.55*	1.55*	
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.	2.05*	.80*	1.35*	1.25*	.90*	.90*	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.15e
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95d
Chazy, N. Y.	12.50	10.50	8.00	12.00	11.50	16.50	10.00	2.50_2
Lime Ridge, Penn.					5.00a			
West Stockbridge, Mass.	12.00	10.00	5.60					2.00t
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	10.50	8.50	10.50	8.50	1.65i
CENTRAL:								
Afton, Mich.							8.50	1.35
Carey, Ohio	8.50	8.00			9.00		8.50	1.50
Cold Springs, Ohio	12.50	8.50	8.50		9.00		8.00	
Delaware, Ohio		8.50	8.50	10.00			8.50	1.50
Frederick, Md.		10.00	10.00	10.00	8.50	10.00	7.00	
Gibsonburg, Ohio	12.50	8.50	8.50		9.00	11.00	8.50	
Huntington, Ind.	12.50	8.50	8.50		9.00		8.00	
Luckey, Ohio	12.50							
Marblehead, Ohio		8.50	8.50		9.00		8.00	1.50w
Marion, Ohio		8.50	.850				8.00	1.70d
Milltown, Ind.		9.00@10.00		10.00p			8.50q	1.40r
Sheboygan, Wis.	11.50						9.50	.95
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00	8.00	
Wisconsin points (f)		11.50					9.50	
Woodville, Ohio	12.50	8.50	8.50	13.50	9.00	10.50	9.00	1.50
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Tex.	22.50						8.00	
Graystone, Ala.	12.50	10.00		12.50			8.50	1.50
Keystone, Ala.		10.00	10.00	10.00	8.50	1.45u	8.50	1.50
Knoxville, Tenn.	20.25	10.00	10.00	10.00			8.50	1.50
Longview, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
New Braunfels, Tex.	18.00	12.00	10.00	12.00	10.00		9.50	
Ocala, Fla.	14.00	13.00	12.00	13.00			12.00	1.70
Saginaw, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
WESTERN:								
Kirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Dittlinger, Tex.		12.00@13.00					9.50p	1.50_4
San Francisco, Calif.	21.00	19.00	16.50				14.00	2.00
Tehachapi, Calif.			8.00				13.00z	2.20x
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) steel; (e) per 180-lb. barrel; (f) dealers' prices, net 30 days less 25c disc. per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days; (i) 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65; (p) to 11.00; (q) to 8.75; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (‡) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.60; (¶) to 10.00; (1) 80-lb. paper bags; (2) to 3.00; (3) to 9.00; (4) to 1.60. (5) to 16.00; (6) wood bbl., steel, 1.80.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Gray Summit and Klondike, Mo.		1.75
Mapleton Depot, Penn.	2.00	2.00@ 2.25
Massillon, Ohio		2.25
Michigan City, Ind. (Engine sand)		.15@ .20
Mineral Ridge, Ohio	*1.75@ 2.00	*1.75
Montoursville, Penn.		1.25
Ohlton, Ohio	1.80	1.80
Ottawa, Ill.	1.25	
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50@ 4.50	3.50@ 4.50
Thayers, Penn.		2.25
Utica, Ill.	1.00@ 3.50	1.00
Warwick, Ohio		2.25
Zanesville, Ohio		2.50

*Wet.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point,

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons	.08
per gross	1.00@ 1.50
Chatsworth, Ga.:	
Crude Talc	5.00
Ground (150-200 mesh), bulk	10.00
Pencils and steel worker's crayons, per gross	1.00@ 2.00
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	9.00@10.00
Including bags	10.00@11.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc	5.00
Ground talc (150-200) bags	10.00@12.00
Pencils and steel workers' crayons, per gross	1.00@ 1.50
Emeryville, N. Y.:	
(Double air floated) including bags; 325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bulk	9.00@14.50
Joliet, Ill.:	
Roofing talc, bags	12.00
Ground talc (200 mesh), bags	30.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (125-200 mesh), bags	10.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 5.00
Mt. Pleasant, Tenn.—B.P.L. 65%	8.00
Tennessee—F.O.B. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	8.00@ 9.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 65-72%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 65%	8.00
Twomey, Tenn.—B.P.L. 65%	8.00@ 9.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton.)

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, F.O.B. plant or nearest shipping point.

Franklin, N. C.—Mine run, per lb.	.05@.10
Mine scrap, per ton	20.00
Clean shop scrap, per ton	22.00
Punch mica, per lb.	.05@.10
Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H. — per ton,	
Mine run	360.00
Clean shop scrap	25.00
Mine scrap	22.00
20 mesh	35.00
60 mesh	45.00
100 mesh	60.00
200 mesh	65.00
Punch, mica, per lb.	.11

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Brandon grey	*11.00	*11.00
Brighton, Tenn.—Pink..	6.00	5.00
Mixed pink and bronze	4.50@ 6.00	4.50@ 6.00
All colors, mixed sizes	3.50	3.50
Buckingham, Que.—Buff stucco dash		12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Dayton, Ohio		6.00@24.00
Easton, Penn., and Phillipsburg, N. J.	12.00@16.00	12.00@16.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio — Concrete facings and stucco dash		6.00@20.00
Middlebrook, Mo.—Red		25.00@30.00
Middlebury, Vt.—Middlebury white		†9.00
Marble flour, 100% thru 80 mesh		3.50
Crusher run marble		3.50
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Stockton, Calif. — "Natrock" roofing grits		12.00@15.00
Tuckahoe, N. Y.—Tuckahoe white	12.00	12.00
Wauwatosa, Wis.		20.00@32.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

†C.L. L.C.L. 17.00.
*C.L. including bags; L.C.L. 14.50
‡C.L. including bags, L.C.L. 10.00.

Potash Feldspar

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 95% through 60 mesh, bags	16.00
96% thru 150 mesh, bags	23.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton	22.00
Erwin, Tenn.—Color, white; analysis, 12.07% K_2O, 19.34% Al_2O_3; Na_2O, 2.92%; SiO_2, 64.76%; Fe_2O_3, .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Glen Tay Station, Ont., color, red or pink; analysis: K_2O, 12.81%, crude (bulk)	7.00
Keystone, S. D.—Prime white, bulk (crude)	8.00
Los Angeles, Calif.—Color, white; analysis, K_2O, 13.78%; Na_2O, 3.68%; SiO_2, 62.97%; Fe_2O_3, .23%; Al_2O_3, 19.20%; crude, bags, 13.50; bulk	12.50
Pulverized, 96% thru 200 mesh, bags, 23.50; bulk	22.20
Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk	20.00
Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Spruce Point, N. C., and Bristol, Tenn.—Color, white; 90% thru 200 mesh, bulk	12.50@20.00
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Topsham, Me.—98% thru 140 mesh, bulk	19.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk	16.00

(Bags 11 cents each, non-returnable)

Blended Feldspar

(Pulverized)

Tenn. Mills—Bulk .... 16.00@20.00

Chicken Grits

Afton Mich. (limestone) per ton	10.00
Belfast and Rockland, Me.—(Limestone), bags, per ton	†10.00
Brandon and Middlebury, Vt., per ton	5.50@10.00
Centerville, Iowa (gypsum) per ton	18.00
Chico, Texas (limestone), 100 lb. bags, per ton	8.00@ 9.00
Danbury, Conn. (limestone)	7.00@ 9.00
Easton, Penn.—Per ton, bulk	3.00
Knoxville, Tenn.—per bag	1.00
Los Angeles Harbor (limestone), 100-lb. sack, 1.00; sacks, per ton, 8.50@9.50†; bulk, per ton	6.00@7.00†
Gypsum, Ohio.—(Gypsum) per ton	10.00
Limestone, Wash. (limestone) per ton	12.50
Rocky Point, Va. (limestone) 100 lb. bags, 75c; sacks, per ton, 6.00 bulk	5.00
Seattle, Wash.—(Limestone), bulk, per ton	12.50
Warren, N. H.—(Mica) per ton	7.70@7.90‡
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.—(Limestone) bulk	7.50@9.00*

*L.C.L.
†Less than 5-ton lots.
‡C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	*17.00
Brighton, N. Y.	*19.75
Dayton, Ohio	12.00@13.50
Detroit, Mich.	15.00@*17.50
Farmington, Conn.	13.00
Flint, Mich.	¶12.50@16.00
Grand Rapids, Mich.	12.00
Hartford, Conn.	*19.00
Jackson, Mich.	13.00
Lancaster, N. Y.	12.50
Madison, Wis.	a12.00
Michigan City, Ind.	11.00
Milwaukee, Wis.	*13.00
Minneapolis and St. Paul, Minn.	11.25
Minnesota Transfer	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	13.50@17.00
Portage, Wis.	15.00
Prairie du Chien, Wis.	18.00@22.50
Rochester, N. Y.	*19.75
Saginaw, Mich.	13.00
San Antonio, Texas	14.00
Sebewaing, Mich.	12.00
Syracuse, N. Y.	16.00@20.00*
Toronto, Canada	13.00@15.60†
Toronto, Canada	13.10
Wilkinson, Fla.	10.00@12.00

*Delivered on job. †Sales tax included. ‡Less 5%. ¶Dealers' price. (a) Less 1.00 E.O.M. 10 days.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.	....	3.47
Atlanta, Ga.	....	2.35
Baltimore, Md.	....	2.25
Birmingham, Ala.	....	2.30
Boston, Mass.	....	2.53
Buffalo, N. Y.	....	2.38
Butte, Mont.	.90¾	3.61
Cedar Rapids, Iowa	....	2.34‡
Charleston, S. C.	....	2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio	56¾	2.37‡
Cleveland, Ohio	....	2.29‡
Chicago, Ill.	....	2.10‡
Columbus, Ohio	....	2.34
Dallas, Texas	....	2.10
Davenport, Iowa	....	2.29‡
Dayton, Ohio	....	2.38
Denver, Colo.	.66¼	2.65
Detroit, Mich.	....	1.95@2.15‡
Duluth, Minn.	....	2.09‡
Houston, Texas	....	2.60
Indianapolis, Ind.	....	2.29‡
Jackson, Miss.	....	2.60
Jacksonville, Fla.	....	2.20
Jersey City, N. J.	....	2.23
Kansas City, Mo.	....	1.92
Los Angeles, Calif.	.61†	2.44†
Louisville, Ky.	.54½	....
Memphis, Tenn.	....	2.60
Milwaukee, Wis.	....	2.25‡
Minneapolis, Minn.	....	2.32‡
Montreal, Que.	....	1.36
New Orleans, La.	....	2.20
New York, N. Y.	....	2.15
Norfolk, Va.	....	2.17
Oklahoma City, Okla.	....	2.46
Omaha, Neb.	....	2.36
Peoria, Ill.	....	2.27‡
Philadelphia, Penn.	....	2.31
Phoenix, Ariz.	....	2.91
Pittsburgh, Penn.	....	2.09‡
Portland, Colo.	....	2.80
Portland, Ore.	....	2.60
Reno, Nevada	....	2.91
Richmond, Va.	....	2.44
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.	....	2.21
Savannah, Ga.	....	2.50
St. Louis, Mo.	.55	2.20
St. Paul, Minn.	....	2.32‡
Seattle, Wash.	10c discount	2.50
Tampa, Fla.	....	2.25
Toledo, Ohio	....	2.20‡
Topeka, Kans.	....	2.41
Tulsa, Okla.	....	2.33
Wheeling, W. Va.	....	2.17
Winston-Salem, N. C.	....	2.78

NOTE—Add 40c per bbl. for bags.
†Delivered on job in any quantity, sacks extra.
‡Ten cents discount for cash, 15 days.

Mill prices f.o.b. in carload lots, without bags to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.	....	1.85
Chattanooga, Tenn.	....	2.45*
Concrete, Wash.	....	2.35
Davenport, Calif.	....	2.05
Detroit, Mich.	....	2.15
Hannibal, Mo.	....	1.85
Hudson, N. Y.	....	1.95
Leeds, Ala.	....	1.95
Mildred, Kans.	....	2.35
Nazareth, Penn.	....	1.95
Northampton, Penn.	....	1.85
Richard City, Tenn.	....	2.05
Steelton, Minn.	....	1.90
Toledo, Ohio	....	2.20
Universal, Penn.	....	1.85

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET. F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board ¼x32x36". Wt. 1500 lb. Per M Sq. Ft.	Plaster Board ⅜x32x36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Arden, Nev. and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	....	....	....	....	11.70u	....	....	....
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50		....	13.50			
Des Moines, Ia.	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	....	....	....	....	....	....	....	m9.00@11.00o	....	....			
Delawanna, N. J.	....	—	—	—	—	8.00	....	8.25@9.40	....	....	.14½s	.15½s	40.00@41.00
Douglas, Ariz.			7.00			15.50d	18.50	....	30.00	15.50			
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	....	24.55	20.00	....	....	....
Gypsum, Ohio‡	3.00	4.00	6.00	8.00	9.00	9.00	19.00	7.00	27.00	20.00	....	15.00	30.00
Los Angeles, Calif.	....	....	10.40k	11.10k	....	....	....	....	....	....	....	....	....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	....	20.00	30.00
Portland, Colo.	....	—	....	10.00	....	—	....	—	—	....	....	....	—
San Francisco, Cal.	....		14.00	14.40	15.40	....	15.40	....	....	....	....	....	....
Seattle, Wash.	6.60	11.00	11.00	15.00	....	16.00	....	....	....	....	....	....	....
Sigurd, Utah	....	....	....	....	....	....	....	....	21.50	....	....	....	....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	....	....		....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross; (d) hair fibre; (i) delivered; (h) delivered in six states; (i) delivered on job; (k) sacks 12c extra, rebated; (m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50; (u) includes sacks; (v) F.O B. N. Y. C. and dealers yard in mill locality.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City of shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	....	....
Cement City, Mich.		5x8x12—55.00¶	
Columbus, Ohio	.16@.18a	....	....
Detroit, Mich.	.16	....	.18
Forest Park, Ill.	18.00*	23.00*	30.00*
Grand Rapids, Mich.	.15	....	....
Graettinger, Iowa	.18@.20	....	....
Indianapolis, Ind.	.13@.15†	....	....
Los Angeles, Calif.¶	5¾x3½x12—55.00	7¾x3½x12—65.00	
Oak Park, Ill.	.18@.21a	....	....
Olivia and Mankato, Minn.	9.50b	....	....
Somerset, Penn.	.18@.22	....	....
Tiskilwa, Ill.	.16@.18†	....	....
Yakima, Wash.	20.00*	....	....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton.

Cement Roofing Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	15.00
Green	18.00

Chicago, Ill.—per sq. 20.00

Cicero, Ill.—Hawthorne roofing tile, per sq.

	Chocolate, Red and Orange	Green Blue
French and Spanish†	$11.50	$13.50
Ridges (each)	.25	.35
Hips	.25	.35
Hip starters	.50	.60
Hip terminals, 2-way	1.25	1.50
Hip terminals, 4-way	4.00	5.00
Mansard terminals	2.50	3.00
Gable finials	1.25	1.50
Gable starters	.25	.35
Gable finishers	.25	.35
*End bands	.25	.35
*Eave closers	.06	.08
*Ridge closers	.05	.06

*Used only with Spanish tile.
†Price per square.

Houston, Texas.—Roofing Tile, per sq. 25.00

Indianapolis, Ind.—9x15-in. Per sq.

Gray	10.00
Red	11.00
Green	13.00

Waco, Texas: Per sq.

4x4 .60

Cement Building Tile

Cement City, Mich	Per 1000
5x8x12	55.00
Detroit, Mich.	Per 100
5x4x12	4.50
5x8x12	8.00
Longview, Wash.	Per 1000
4x6x12	52.00
4x8x12	64.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Grand Rapids, Mich.:	Per 1000
5x8x12	70.00
Houston, Texas:	
5x8x12 (Lightweight)	80.00
Pasadena, Calif. (Stone-Tile)	Per 100
3½x4x12	3.00
3½x6x12	4.50
3½x8x12	6.00
Tiskilwa, Ill.—8x8, per 100	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile)	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.	14.00 22.50@27.00
Yakima, Wash.—Building tile:	
5x8x12	.10

Cement Drain Tile

Graettinger, Iowa—5 to 36 in., per ton	8.00
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile per ft.:	
3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waukesha, Wis.—Drain tile, per ton	9.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	30.00@35.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slag-tex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@75.00
Milwaukee, Wis.	14.00	25.00@32.00
Mt. Pleasant, N. Y.		14.00@23.00
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	11.00	....
Philadelphia, Penn.	15.00	20.00
Portland, Ore.	17.00	25.00@75.00
Prairie du Chien, Wis.	14.00	23.00@27.00
Rapid City, S. D.	18.00	25.00@40.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Wauwatosa, Wis.	14.00	21.00@42.00
Westmoreland Wharves, Penn.	15.00	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	....

†Gray. ‡Red.

Canada Increases Use of Cement Products in 1925

REVISED statistics show an increasing use in Canada of cement products. In one year from 1924 to 1925 there was an increase of 81 plants and a 61% increase in the value of the products. The following figures are of interest:

	1925	1925
Number of establishments	116	197
Capital investment	$1,673,758	$2,594,736
Number of employes	455	819
Salaries and wages	$ 425,078	$ 697,716
Cost of materials	493,270	730,296
Value of products	1,257,871	2,020,239

Of the 197 plants engaged in this line of production, 148 were located in Ontario, 34 in Quebec, five in New Brunswick, four in British Columbia, three in Alberta, two in Saskatchewan and two in Nova Scotia.

Superior Portland Cement Sets Off Big Blast

THE Superior Portland Cement Co. operating at Concrete, Wash., set off a huge blast at its quarry north of that city recently. Twenty-one tons of dynamite were used, which were put in 13 drill holes and three coyote holes. This loosened approximately 117,000 tons of rock.—*Bellingham (Wash.) Record.*

To Build Concrete Village in England

AT Barnes, England, a Thames-side suburb with an extensive common, an open space of land, is going to be converted into a village green, surrounded by 10 streets of houses of an appropriate character—and color—as part of a new working-class housing scheme of the London county council. Careful attention is being paid to the design and coloring of the houses, which will be constructed of concrete.

Some of the houses will be faced with cement roughcast of various shades, and the builders propose in other cases to use a recently-discovered process which colors concrete by means of vegetable dyes.

The houses are intended as workmen's dwellings. There are to be 657 houses at first and 37 more will be added later if additional land can be obtained.—*The Quarry and Surveyors and Contractors Journal.*

Current Prices Cement Pipe

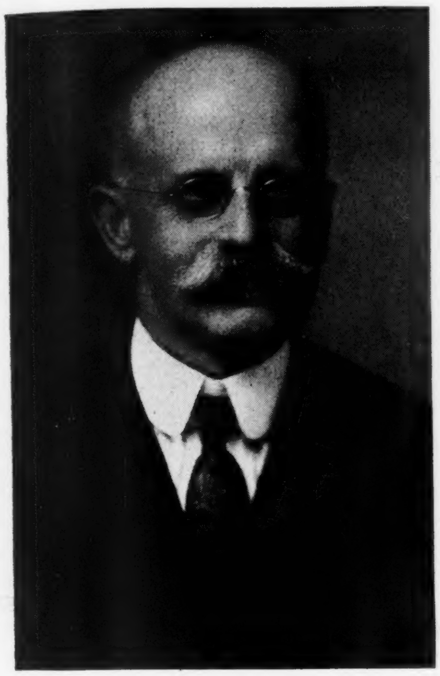
Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.	15.00 per ton																
Graettinger, Iowa	.04½d	.05½	.08½	.12½	.17½	......	.40	.50	.60	.70	......	......	......	......	......	......	—
G'd Rapids, Mich. (b)	......	......	......	.60	.72	1.00	1.28	......	......	1.92	2.32	3.00	4.00	5.00	6.00	......	—
Houston, Texas	......	.19	.28	.43	.55½	.90	1.30	......	†1.70	2.20	......	......	......	......	......	......	—
Indianapolis, Ind. (a)	......	......	......	.80	.90	1.10	1.30	......	......	1.70	......	2.70	......	......	......	......	—
Longview, Wash.	Sewer pipe 40% off list, culvert—list																
Mankato, Minn. (b)	......	......	......	......	......	......	......	......	......	1.50	1.75	2.50	3.25	4.25	......	......	—
Newark, N. J.	6 in. to 24 in., $18.00 per ton																
Norfolk, Neb.	......	......	......	......	.90	1.00	1.13	1.42	......	......	2.11	......	2.75	3.58	......	6.14	7.78
Olivia, Mankato, Minn.	12.00 per ton																
Paullina, Iowa‡	......	......	......	......	......	......	......	2.25	......	2.11	......	2.75	3.58	......	6.14	......	7.78
Somerset, Penn.	......	......	......	......	1.08	1.25	1.65	......	......	2.50	......	3.65	4.85	7.50	8.50	......	—
Tacoma, Wash.	.15	.18	.22	.30	.40	.60	.75	......	......	......	......	......	......	......	......	......	—
Tiskilwa, Ill. (rein.) (a)	......	......	......	.65	.75	.85	1.10	1.60	......	1.90	......	2.25	3.40	......	5.50	......	—
Wahoo, Neb. (b)	......	......	......	......	1.00	1.13	1.42	......	......	2.11	......	2.75	3.58	4.62	6.14	6.96	7.78
Waukesha, Wis.	12 in. to 60 in. 18.00 per ton																
Yakima, Wash.	$10.00 per ton																

*30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced.
†21-in. diam. ‡Price per 2 ft. length. (d) 5 in. diam. [1]@1.08 [2]@1.25. [3]@1.65. [4]@2.50. [5]@3.85. [6]@5.00. [7]@7.50.

E. S. Healey, President Glencoe Lime and Cement Co.

E. S. HEALEY, who succeeds Col. C. W. S. Cobb as president of the Glencoe Lime and Cement Co., St. Louis, Mo., is one of several prominent American lime



manufacturers who came originally from the famous Rockland, Maine, lime district. He was born at Thomaston (about six miles from Rockland) in 1859 and went to St. Louis in 1886 as the local representative of the Hurricane Isle Granite Co. of Rockland. In those days the Maine granite quarries shipped paving blocks to nearly all parts of the United States.

In 1889 Mr. Healey joined with Colonel Cobb, also a native of the Rockland district, in the organization of the Glencoe Lime and Cement Co. Colonel Cobb was president and Mr. Healey vice-president and treasurer. They engaged in lime manufacture at various points in Missouri south of St. Louis and in an extensive building supply business in St. Louis.

On September 28 last, Colonel Cobb relinquished his duties of president to become chairman of the board of directors, Mr. Healey becoming the president. Mr. Healey resides in Webster Groves, Mo., where he is president of the Webster Groves Trust Co.

New Company Formed to Take Over Kutztown Interests

THE Penn Limestone Co., recently incorporated for $100,000, has been organized to take over the purchase and operate the large limestone quarry of the Kutztown Stone Co., Kutztown, Penn., according to the Reading (Pa.) *Eagle*. The property was purchased by U. S. G. Bieber, who was the head of the old Kutztown company, and will now head the new organization.

The quarry is located at Hinterleiter's Crossing, along the Kutztown branch of the Reading company, near the city.

One-half of the authorized capital of $100,000 will be divided into preferred shares and the balance into common stock.

Sandy Pratt's Company Buys Second Plant

CLARENCE (Sandy) Pratt, president of the Pratt Building Co. and the Pratt Rock & Gravel Co., producers of sand, crushed rock and gravel, announces a second purchase for his companies of another plant. The latest addition is the sand and gravel plant of the American River Sand and Gravel Co., located at Mayhew, Sacramento County, Cal. This company was owned and operated by the late William S. Hatch, president of the Hatch Warehouse Co., and George S. Tyler. This new property has rail connections and controls over a half-mile of land along the American river, and a deposit estimated to contain over 2,500,000 tons of gravel and sand is on the property.

Recently Mr. Pratt announced the purchase for this companies of the Vulcan Rock Co.'s property at Hoyt, Solano County, where a cementing road rock, for state and county highways, is produced. (ROCK PRODUCTS, October 16 issue.)

From the new Pratt plant on the American river, sand and gravel for building and road construction will be shipped.

Besides the above properties the Pratt company has sand, crushed rock and gravel plants at Sacramento, Marysville, Prattrock (near Folsom), and Prattco (Monterey County). Their central office is in San Francisco and Howard W. Senter is secretary and Clarence (Sandy) Pratt president of the four above companies.

Arkansas to Have New Lime Plant

A NEW modern lime kiln and plant is to be built on the Frisco railroad, just south of the Sand Springs bridge across the Arkansas, according to an announcement made by T. H. Steffens, vice-president of the Sand Springs railway.

The plant will have a daily capacity of 25 tons, or about 275 bbl. It will furnish employment to about 15 men and is expected to be in operation in about 45 days. Construction is to begin at once.

It will be built and operated by the Sand Springs Lime Co., a new Oklahoma company just being incorporated, and headed by J. S. Greer, stone quarry operator of Sand Springs.

Greer spent considerable time in investigating lime rock formations in this part of the state before deciding upon the location. The stone at the point selected was found to be best for the purpose after careful tests. The output is expected to be high grade building lime.—*Oklahoma City (Okla.) Times.*

H. G. Jacobsen Joins Bates Valve Bag Company

H. G. JACOBSEN, manager of the accident prevention and insurance bureau of the Portland Cement Association, has resigned, effective November 1, to join the sales organization of the Bates Valve Bag Co., of Chicago.

Mr. Jacobsen was given full credit, at the recent meeting of the cement mill section of the National Safety Council, with having been largely instrumental in accomplishing the remarkable record in accident prevention, for which the portland cement industry has received world-wide recognition.

At the Detroit convention of the National Safety Council on October 26, Mr. Jacobsen was presented by his friends and fellow workers for safety in the cement industry with a handsome white gold watch and chain, and with a memorial signed by the representatives of every cement company

H. G. Jacobsen

present, expressing their everlasting appreciation of his splendid and whole-hearted work for them.

The bureau of accident prevention and insurance of the Portland Cement Association, according to an announcement made at the Detroit convention, will hereafter be in charge of A. J. R. Curtis as assistant to the general manager. Mr. Curtis, heretofore, has been the head of the cement products bureau of the association.

Ball-Newark Gravel Company Plant Now Under Way

THE plant of the Ball-Newark Gravel Co., which was recently opened at Newark, Ark., is well under way, according to the Little Rock (Ark.) *Gazette*. The company has completed the construction of tracks into the gravel pit and has a steam shovel in operation.

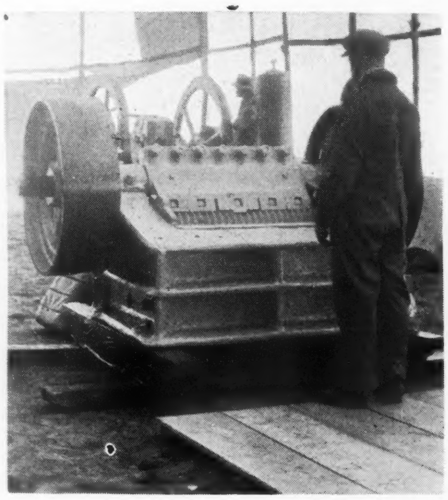
The new concern is prepared to take care of road gravel requirements within a radius of several counties. It has entered into contracts with the commissioners of the Walnut Ridge and Arkansas State Highway Department for the supply of gravel for the Alicia-Tuckerman highway, the report states.

The Ball-Newark Gravel Co. was organized recently with capital of $50,000. Officers and directors are J. J. Ball, president; W. D. Cammack, vice-president; Charles M. King, secretary-treasurer; William J. Camp and Miss Ivy Creger, directors. Ball, Cammack and King are owners of the Ball-Benton Gravel Co., who operate plants at Benton and other points in Arkansas which are not affected by the new organization.

Great Interest Shown at Second All Western Road Show

THE second All Western Road Show held at San Francisco, Calif., on October 7 to 15 inclusive, was attended with a great deal of interest by many Pacific Coast and western producers of road material as well as road contractors. Among the features of the show was an excellent exhibit of road machinery and equipment presented by manufacturers of these products. Because of their adaptability to the rock products industry, a few of the exhibits are shown in the accompanying cuts.

The gyratory crusher pictured is one of several types manufactured by the Smith Engineering Works, Milwaukee, Wisc., and the portable conveyor or wagon loader is a 36-ft. Northern King type driven by a 2-cylinder Le Roi gasoline engine. The jaw crusher is of Cedar Rapids make specially adapted to the crushing of gravel. The Moreland truck pictured should interest all rock products operators, for it is specially built to carry heavy loads. It is powered with a 6-cylinder motor of 105-hp. rated capacity. The truck body is capable of holding 10 tons of crushed rock. The design, it is said, is such that the greater part of the load is distributed equally on the two heavy duty rear axles.



Jaw crusher adapted to gravel crushing on exhibit at All Western Road Show

Buffalo Gravel Corporation's New Plant

THE Buffalo Gravel Corp. of Buffalo, N. Y., is erecting a plant at Hertel Ave. and the Niagara River in Buffalo which is to cover about 20 acres. One reason for so large an area is that very large storages of both washed and unwashed material are to be maintained. The material which the plant will wash and size is dredged from the lake and brought in to the plant by barges or in dredges of the hopper type, and the plant must be prepared to deal with large quantities of it quickly and without interfering with other operations. In bad weather the ample raw storage will permit the plant to run even though the dredges cannot leave the harbor.

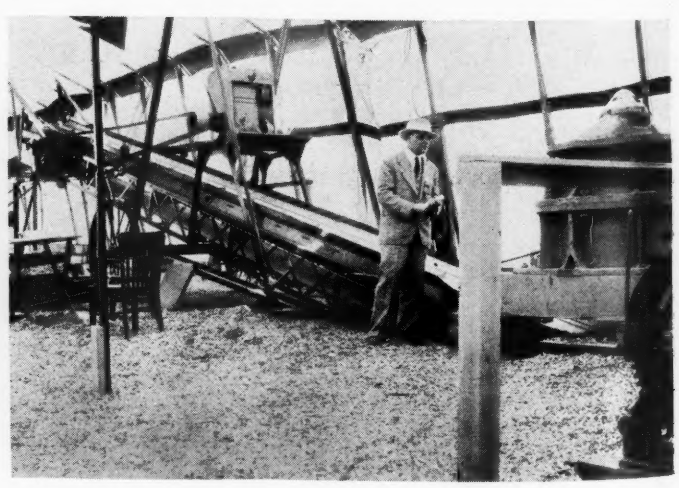
The raw storage will be carried in a long pile over a 250-ft. tunnel in which there is a 30-in. conveyor belt. But other storage piles are to be built at the side so that the material can be side cast by a locomotive crane to the long pile above the tunnel. The storage of the finished product is over a tunnel in which there is a 30-in. conveyor 285 ft. long with storage piles at the side, as in the case of the raw storage.

The washing plant was designed by C. S. Huntington, engineer of the Link Belt Co., and it will be of the right angle type, as a number of his latest plants have been. This type is especially adapted to the present plant location. The conveyor comes up from the raw storage, which is along the river front and crosses over the railroad tracks, which are along the river. The bins are set in line parallel with the tracks, the loading spouts for rail delivery being on one side and for truck delivery on the other side.

All the raw material will go to a 16 ft. by 48 in. scalping screen and the oversize will fall to a No. 8 McCully Superior (Allis-Chalmers) gyratory crusher. The crusher discharge will be returned to the plant conveyor by a shorter conveyor so that it will enter the scalping screen, which is thus placed in closed circuit with the crusher. The undersize of the scalping screen will go to two lines of Dull (Link Belt) screens of 96 in. diameter at the large end. The products except sand will fall to bins and the sand will go to sand boxes fitted with a flight conveyor to drag out the settled sand. These are being built by the Link Belt Co.

Concrete will be the material most employed in the construction of this plant. There will be six reinforced concrete bins, one for raw mix, three for sized gravel and two for two grades of sand.

H. A. Stelley, who is in charge of production, informed ROCK PRODUCTS recently that it was the intention of the company to have the plant producing by May 1, 1927, and that from present indications this expectation would be fulfilled.



New 10-ton truck (left) and wagon loader and gyratory crusher shown at All Western Road Show

Finishing Lime Manufacturers' Association of Ohio

Start Active Promotional Work with L. E. Johnson as Manager

THE Finishing Lime Manufacturers' Association of Ohio was founded last spring. The first mention of it was made in ROCK PRODUCTS, May 29. Upwards of 500,000 tons a year of Ohio finishing hydrate is produced and marketed, and the potential producing capacity of this district has tremendously increased in the last few years, both by newcomers into the field and by great increases in the capacities of the older plants.

Fred Witmer

The problem of the Ohio finishing hydrate manufacturers is somewhat different from that of other American lime manufacturers in that they have a product of national distribution, and one that is used practically exclusively in building construction. In recent years the Ohio hydrate manufacturers have become extensive advertisers in a national way. The next step, from the very nature of things, was inevitable. This step is now taken and the Ohio manufacturers have banded together in a strong organization for a co-operative promotional and advertising campaign.

The man selected to manage this work is L. E. Johnson, recently manager of the Blue Diamond mortar plant of the Stewart Sand Co., Kansas City, Mo., and prior to that one of the field engineers of the Chicago office of the National Lime Association.

The president of the Finishing Lime Manufacturers' Association of Ohio, as noted in ROCK PRODUCTS, May 29, is Fred Witmer, president of the Ohio Hydrate and Supply Co., Woodville, Ohio. President Witmer recently gave the press the following statement in regard to the aims and purposes of the new organization:

"The manufacturers have a common interest with uniform analyses of rock, methods of manufacture, geographic location of plants, form of material, class of package, markets, transportation and advertising. This organization of producers has the distinction of being probably the only group of manufacturers with a subtantial tonnage that have such a common interest.

"The object of the association will be to promote the use of Ohio finishing limes for the many purposes for which they are especially adapted; to develop new uses through research; to handle matters pertaining to traffic, advertising, manufacture and other problems of common interest to all the members.

"Ohio finishing limes have found ready markets in all parts of the country and at times have even crossed the seas to foreign markets. The organization will naturally aim to protect and preserve, as well as to further, these markets.

"It is hoped that the association will be able to protect builders, architects, contractors and dealers by constantly keeping them advised of the rock elements found in northwestern Ohio and the uses for which Ohio finishing limes are ideally adapted. The organization also expects to deal with other associations in bringing about a better understanding as to specifications for the use of Ohio finishing lime and the distribution of the products of our membership.

"The association will establish a standard of quality, which will have to be maintained by the member companies and which will be a requisite to membership. The products manufactured will likewise have to pass the standard specifications of the American Society for Testing Materials.

"The association headquarters have been established in the Home Bank and Trust Co. building, Toledo, Ohio.

"All of our members are strong for 100% dealer distribution of their lime.

"The membership consists of: Kelley Island Lime and Transport Co., Cleveland; Woodville Lime Products Co., Toledo; National Mortar and Supply Co., Pittsburgh; National Lime and Stone Co., Carey; The Luckey Lime and Supply Co., Luckey, and The Ohio Hydrate and Supply Co., Woodville."

L. E. Fishack Joins Ohio Hydrate and Supply Co.

L. E. FISHACK has been appointed sales manager of the Ohio Hydrate and Supply Co., Woodville, Ohio, succeeding Fred Witmer, who advanced to the presidency of the company following E. G. Baker's death.

L. E. Fisback

Mr. Fishack is well known in the lime and gypsum industries, having been actively engaged in this field for a number of years. After the Fishack Gypsum Co. of which he was president, was taken over by the American Gypsum Co., he remained with the latter company as assistant sales manager for about three years. Following this, he was for four years a salesman for the Sandusky Cement Co. Since that time he has been engaged in the finishing lime industry and closely identified with association work. He is a past president of the Toledo Builders Exchange and the Ohio Builders Exchange.

Merger of Three New England Lime Producers

ACCORDING to recent announcement, the Lee Lime Co., the Tobey Lime Co. and the Connecticut Lime Co. have been consolidated into one large company to be known as the Lee Lime Co. Headquarters will be maintained at Lee, Mass.

The officers of three merged companies make up the board of directors of the new company, of which John M. Deely is president. No changes in management, sales organization or personnel has been made. Trademarks and individual brands will be maintained as before. Two new features, the inauguration of a chemical and engineering staff and a field division to assist retailers, are among things planned for the near future.

Pacific Portland Cement Co. to Increase Capacity

THE Pacific Portland Cement Co., Consolidated, San Francisco, Calif., has construction under way to increase the capacity of its present plant at Redwood City, Calif., by an additional 3000 bbl. per day, which will make a total daily output of 5500 bbl. for this plant alone. This, added to the 4500 bbl. the company's other and larger plant at Cement, Calif., is turning out daily, will increase the total number of barrels produced by the Pacific Portland Cement Co. per day to 10,000 bbl.

The plant at Cement has 11 kilns, ten 7x80 ft. and one 8x100 ft., using the dry process. The Redwood plant is a wet-process operation, using at present only two kilns, 10x235 ft. Robert B. Henderson is president and general manager of the company. Offices are at 827 Pacific Bldg., San Francisco.

New Owners of Batesville Quarry Will Increase Plant Capacity

A NUMBER of improvements and additions to the old Pfeiffer stone quarry, Batesville, Ark., which changed hands recently, are planned by John P. Cargill and associates, the new owners, according to the Ft. Smith (Ark.) *American*. New leases have been obtained and the capacity of the plant will be enlarged in the near future.

The quarries operated for 22 years by Charles A. Pfeiffer and sons of St. Joseph, Mo., were sold recently to Mr. Cargill and associates of Kansas City under foreclosure. The purchase price was $177,350 and court costs, under chancery court foreclosure order.

Further expansion plans along with acquisition of the works by the new owners call for the development of the marble quarries which furnished material for many of the public buildings of the state, including the state capital and the new University of Arkansas buildings.

Work Progressing Rapidly on New Plant of Florida Cement Company

AT the rapid rate work on the new plant of the Florida Portland Cement Co. at Hooker's Point, Tampa, is going forward, there is no doubt but that the plant will be completed and ready for production early next spring as scheduled. Construction work on the docks, bulkhead, track, trestles and foundation pilings at the plant site has all been completed, and the actual work on the plant begun.

The contract for the docks, bulkheads, etc., was held by the Foundation Co. of New York and Atlanta, and involves an expenditure of approximately $500,000. Work on the 800-ft. dock, 1300-ft. bulkhead and the foundation piling was started March 11 and completed September 26, one of the quickest jobs of construction for the amount of work involved ever completed by the Foundation Co. J. E. Walsh was superintendent in charge.

The building of the plant is under the direction of O. A. Hartley, superintendent of construction for the Cowham Engineering Co. The work of installing equipment for the pouring of concrete and erecting the steel for the building, housing the machine shop and store room for the Florida Portland Cement Co. is now under way.

New Cathode Ray Tube Makes Cold Stone Glow

A NEW cathode ray tube which has made cold stone luminous, removed hair from an animal and seemingly grew hair of a different color in the same spot, has been invented by Dr. W. D. Coolidge, assistant director of the research laboratories of the General Electric Co., according to an Associated Press despatch published in the Chicago *Tribune*. The report states that as yet no practical use has been found for the rays from the tube but there are apparently limitless fields for experiment and research. The tube, Dr. Coolidge says, produces as many beta rays, the most important rays of radium, as could be obtained from a ton of radium.

Some very interesting phenomena were described but those perhaps of the greatest interest to ROCK PRODUCTS readers are the effects observed when the rays were turned on a crystal of calcite and a lump of dolomite. In a darkened room, and with a current of 350,000 volts applied to the tube, the rays were visible as a purple glow in front of the "window." While the rays were visible the odor of ozone was noticeable. The "window" is of nickel foil and the cathode rays, or electrons, from inside the vacuum tube are passed through it. These electrons are set in motion within the tube and are quite active outside of it.

A crystal of calcite, Iceland spar, was placed in front of the "window." As the rays were played upon it, it glowed as though "red hot"; when the rays were shut off the calcite continued to glow. Passed from hand to hand of the witnesses, this specimen looked like something that would sear the flesh at the slightest contact, but was in fact stone cold. Its luminosity continued for several hours.

A lump of pure dolomite was similarly affected, except that the glow of the rayed dolomite was pinkish, while the calcite was orange. Granite subjected to the cathode ray became iridescently luminous, greens, blues, and yellows glowing, but the luminosity ceased when the ray was turned off.

The rays, it is said, kill insects and bacteria quickly, but Dr. Coolidge has not tried them upon human flesh. An application of the rays for one-tenth of a second to the ear of a rabbit caused a scab to form, which sloughed off some days later, leaving a bald spot. After a second application of the ray white hair grew where the brown hair had fallen out, and the new growth was three times as luxuriant as the old.

Alabama Lime Co. to Build New Kilns and Large Crushing Plant

THE Alabama Lime Corp. of Birmingham, Ala., will begin construction at once at Calera, Ala., of a new lime burning plant and a stone crushing plant which will have a capacity for 500 tons per hour.

The Schaffer Engineering Co. will build the plants and install eight Schaffer automatic kilns eventually, although only four are to be erected at the present time. These kilns will be 90 ft. high and 17 ft. 3 in. inside diameter. Each will produce 40 tons of burned lime daily. The fuel ratio expected is five tons of lime per ton of coal. The hydrating department will contain a "No. 3 Super Hydrate Plant," which will turn out four tons per hour. A larger plant will be installed later.

Steam shovel loading will be used in the quarry. The crushing plant will be equipped with a scalping screen and the oversize of this screen will be used for kiln stone. The remainder will be crushed to commercial sizes.

Foundations for two kilns are already being poured. Two more are to be erected as soon as these are in operation.

Calera is 34 miles south of Birmingham on the L. and N. and Southern railways. The company owns about 9000 acres of land there, all underlaid with limestone.

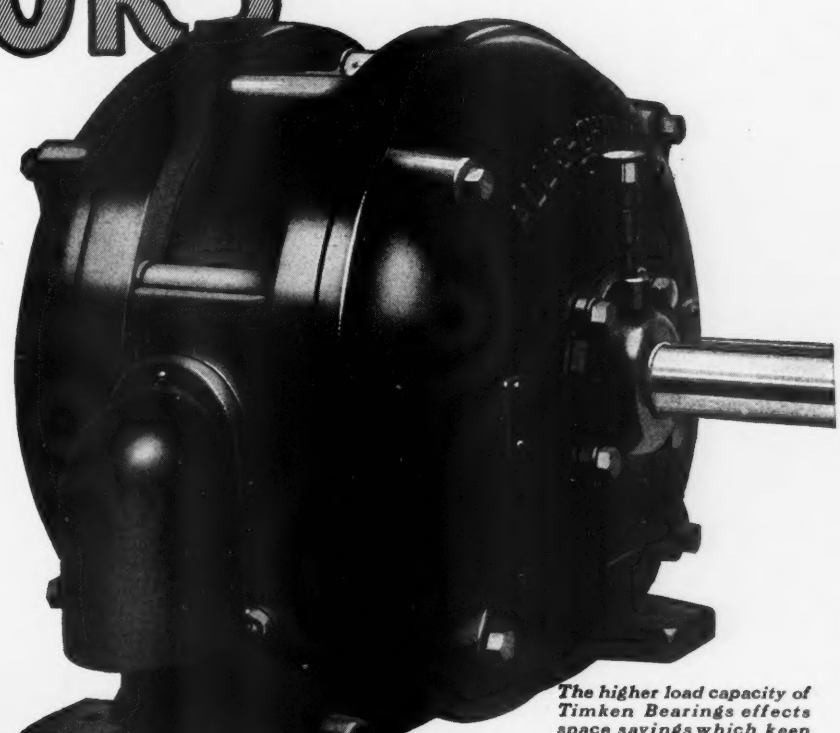
The officers of the Alabama Lime and Stone Corp. are: E. T. Schuler, president; R. N. McDonough, vice president and general manager; F. C. Marquis, vice president; W. W. Wood, vice president; Harry Burgess, secretary and treasurer. The directors are: W. C. Gewin, F. C. Miller, W. J. Weilding and W. F. Hall.

Gypsum Products Plant to Be Built in San Antonio

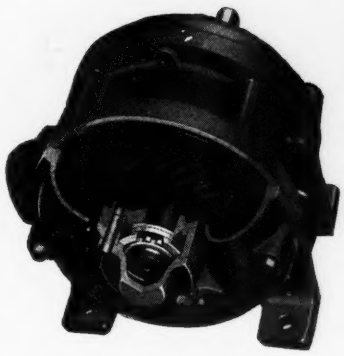
A NEW gypsum products plant is to be erected in San Antonio within the next few months, according to an announcement made by the San Antonio (Tex.) *News*. The project is being planned by a company now being incorporated by Henry M. Skue and Guy Rieves, both of San Antonio, who hold a 25-year lease on what is said to be one of the richest gypsum deposits in the west, located at Malaga, Eddy county, New Mexico.

In a government test recently made it was found that the tract, which includes 163 acres of land in the flat regions of New Mexico, is an unusually good one, rich deposits lying only a few inches under the surface. Analyses of gypsum taken from the New Mexico deposits during the past six months show it to be a high-grade product and especially adaptable to use for the manufacture of plaster.

ALLIS-CHALMERS MOTORS



The higher load capacity of Timken Bearings effects space savings which keep Allis-Chalmers Enclosed Motors nearer in size to the corresponding standard open ratings.



The liberal use of electric steel had made Allis-Chalmers motor frames virtually shock-proof . . . . the unit-assembly of laminations assured permanent core rigidity . . . . the silver brazing of rotor bars to end rings meant an indestructible rotor . . . . a special final insulation process kept the windings like new . . . . and then the moving parts were given equal permanence through the use of Timken Tapered Roller Bearings.

Timkens carry thrust as well as radial loads, with perfectly lubricated rolling motion, under all conditions. Bearing capacity is increased, but shaft length is reduced, permitting a whole series of improvements and economies—from basic design to operating position on your job.

Every motor user is interested when the Allis-Chalmers name is on motors that can be kept wear-proof with only a very few greasings yearly!

Shaft length averages 15% less in Allis-Chalmers Anti-Friction Types.

ALLIS-CHALMERS MFG. CO., Milwaukee
District Sales Offices in all Principal Cities

News of All the Industry

Incorporations

Dillon Concrete Co., Seattle, Wash., $75,000. H. E. and L. F. Dillon and Robert Huntley.

National Potash Corp., Dover, Del., $100,000; deal in potash, phosphate, etc.

Slingluff Concrete Processing Co., 73[illegible] Eislen Ave., Baltimore, Md. W. L. Marbury, Jr.

Ball-Newark Gravel Co., Newark, Ark., $50,000. J. J. Ball, W. J. Camp.

Gypsum Products Sales Corp., Del., New York, N. Y., 100 common, no par.

Arrow-Head Gravel and Sand Co., Plattin, Mo., $100,000. Joseph C. Louis, Chas. G. Milligan.

Brighton Quarries, Ltd., Toronto, $40,000; to manufacture and deal in brick, artificial stone, etc.

Western Artificial Stone Works, 1769 Howard St., San Francisco, Calif. Wm. Berwick and Ray Raggeri.

Stephen J. Meade, New York, N. Y., 100 shares, $100 each; 100 common, no par. S. J. Meade, F. Colety. (Filed by P. Crichton, 475 5th Ave.)

Duocrete Products Corp., Los Angeles, Calif., $50,000. Frank M. Shallue, of Oakland; Frank S. Honberger, of Los Angeles, and Paul S. Honberger, of Pasadena.

Tri-State Ornamental Plaster Co., Memphis, Tenn. John A. Mason, Jr., Fay A. Murray and others.

Concrete Pressure Pipe & Construction Co., Gilroy, Calif., $25,000. Harry C. Scholten, George Eastman and L. Scholten.

Alhambra Mission Stucco Co., San Francisco, Calif., $20,000. E. H. Peterson, H. C. Martin, T. W. Simmie, J. H. Morris and Edward Matson.

Red Mountain Magnesite Co., San Francisco, Calif., $300,000. F. Clemens, J. Claiborne, K. O'Toole, J. T. Boynton and C. C. Boynton.

Southern Lime Products Corp., Wheeling, W. Va., $150,000. A. S. Burger, 117 Elm St., Edgewood, W. Va.

Supreme Cement and Concrete Co., New York, N. Y., $10,000. S. Hechtor, M. Rubin, H. Davis. (A. M. Hillman, 38 Park Row, Manhattan.)

Blue Diamond Co. of Washington, Wilmington, Del., $2,100,000; lime and rock. (Corporation Trust Co. of America.)

Aetna Roofing Tile Co., Inc., Manhattan, N. Y., $100,000; to deal in tile, slate, marble and building materials. H. Lefcort 1675 Popham Ave., Bronx.

New Tile Sales Corp., 14320 East Jefferson Ave., Detroit, Mich., $100,000; building material, products of New Tile Corp.

G. F. Boyce, Cherry Valley, N. Y., $40,000; stone. G. F. and M. C. Boyce, G. M. Burton. (Filed by W. H. Maider, Gloversville, N. Y.)

National Silica Sand Co., Mineral Ridge, O., $200,000. William, H. F., and Walter Banfield and L. E. Cline.

Central Park Sand and Gravel Co., Mineola, N. Y., $5,000. N. Pellico, N. A. Parks, C. Feyer. (Filed by L. A. Feyer, 1515 East 28th St., Brooklyn.)

Pre-Cast Tile-Marble-Stone Co., New York, N. Y., $100,000. W. J. Flynn, N. L. Kalman, E. R. Bayer. (Filed by F. A. Muldoon, 3029 Third Ave.)

Corydon Crushed Stone and Lime Co., Corydon, Ind., $15,000; quarry and produce crushed stone. Directors: Charles A. Keller, Ed S. Bulleit, Edgar L. Miles, Will J. Bulleit, C. A. Quebbeman.

Coogan Gravel Co., 1020 Peoria Life Bldg., Peoria, Ill., $75,000; to produce and deal in sand and gravel, etc. P. M. Coogan, F. G. Bruniga, Deeta E. Clark.

Peterson Roofing Tile and Concrete Product Co., Ltd., Beaverton, Ont., 12,500 preference shares of $10 each and 25,000 common shares of no par value. E. S. Peterson, D. V. Klein and others.

Mohawk Plastic Magnesia Corp. of New England, Worcester, Mass., $10,000; 100 shares $100 each. Pres., Claire D. Lamoreux; vice-pres., Mary Lamoreux; treas., Amadee J. Lamoureux, 575 Chandler St., Worcester.

Farmingdale Concrete Products Co., Farmingdale, N. Y., 200 shares, $100 par value, and 200 shares of common stock, no par value. C. D. Bailey, H. M. Bruns. (Corr.: H. M. Pitman, 285 Madison Ave., New York.)

Quarries

Holly Sugar Co., Torrington, N. Y., has put a crew of 18 men to work on a new quarry recently leased. A spur line from the plant will be built within a short time.

Edward Sidebotham & Son, 1659 Harbonne Ave., Lomita, are building a $1500 addition to their rock bunkers in Wilmington, Calif.

Wakefield Crushed Stone Co., Wakefield, Mich., has just begun the erection of a 50x110-ft. machine shop, compressor house and garage. It is expected to have the work completed before the severe weather sets in.

Carthage Marble and Building Stone Co., Carthage, Mo., has just completed and placed in operation a new $10,000 limestone crushing plant. The new plant is in charge of Fred Richardson. Several improvements, including the replacement of the old frame sawmill building with a structure of stone, are also under way. B. L. Van Hoose is proprietor of the company.

Charles Bianchi & Sons, Barre, Vt., are erecting a steel granite plant, 64x100 ft., on the site of their present buildings.

Sand and Gravel

The State of Nebraska, it is reported, has had a 500% increase in the production of gravel during the last five years.

New York Wall Street Journal, in a recent report on the condition of various industries throughout the country, announces that the sand, gravel and crushed stone industries, due to flood conditions, experienced some operating delays and temporary car shortage, but that the situation is now well in hand.

Lake Charles Building Material Co., Lake Charles, La., has plans under way for the installation of loading, handling and other conveying equipment at its sand and gravel deposits.

The Keystone Gravel Co., Indianapolis, Ind., has moved from 7102 N. Keystone Ave. to 2300 E. 71st St.

Sherwood (N. D.) City Council has recently purchased a gravel pit two miles southwest of the city. The plot covers about three and one-half acres and will, it is reported, supply gravel for Sherwood streets.

Porter Construction Co., who established a sand and gravel plant at Lobert, Ore., about a year ago, is reported to be having such heavy demands for sand because of the excessive building construction work being done in that locality that an enlargement to their plant is contemplated for next season.

The Van Sciver Corp., Philadelphia, Penn., is contemplating building a two-story branch storage and distributing plant, 35x175 ft., which will cost about $60,000 with equipment.

Van Owen Sand and Gravel Co., 12340 Van Owen St., Lankershim, Calif., is making alterations to its sand bunker.

Mayfield, Ky. One man was killed and two others injured in a slide at a gravel pit near Mayfield. Seven other workmen in the same pit escaped. The man killed and the two injured were buried under 20 tons of gravel as it slid into the pit.

Lime

S. W. Barrick & Sons Co., manufacturers of commercial and agricultural lime in Woodsboro, Md., recently suffered a loss of $40,000 when one of the buildings of their plant was destroyed by fire.

The State of Nebraska, through its College of Agriculture, it is reported, is planning on making tests in Johnson county to determine just what the effect of the addition of lime to some soils in the county will have upon the growing of legumes. The lime will be furnished free to farmers who wish to co-operate in making the tests.

J. N. Turner, Jr., has purchased from R. T. Gaddie a half interest in the Farmer Lime Co., Campbellsville, Ky., manufacturers of agricultural lime, building lime and lime products.

The Norton Stone and Lime Corp., with quarries at Cobleskill, N. Y., filed a voluntary petition in bankruptcy in Federal Court October 10. Schedules of debt will be filed later.

Gibsonburg Lime Products Co., Gibsonburg, O., recently organized, is reported to be erecting a lime plant, the construction of which is already under way. The railroad tracks have been laid connecting with the Pennsylvania line and the foundations for the buildings are being completed. F. W. Zorn has been elected president of the firm.

Gypsum

Magnestone Products Corp. has been succeeded by Le Compte & Co., Inc., Baltimore, Md., and improvements have been made to both building and equipment, to increase output of magnesite stucco and composition floor to 300 tons per day.

Cement

Trinity Portland Cement Co., Dallas and Ft. Worth, Tex., has just been issued a permit to build a concrete office building at their new plant site, Houston, Tex., to cost $25,000.

The Texas Portland Cement Co., Houston, Tex., which has employed a force of 148 men for nine full working months without an accident in loss of time, hopes to keep up the record, it is reported, for the next three months and win the silver cup for the best "no accident" record.

Great Lakes Portland Cement Co., Buffalo, N. Y., will have a new grinding mill unit at its plant, now in course of construction, according to plans filed recently. The building will cost about $80,000. The entire plant, however, will, it is estimated, represent an investment of about $1,500,000.

Beaver Portland Cement Co., Gold Hill, Ore., has begun the construction of a new hydroelectric power plant, to cost $150,000 with machinery. Floyd W. Allen, Portland, is consulting engineer.

Eastwoods Cement Ltd., England, is expecting to start production soon from their new 200-ft. kiln now under process of construction. The driers and coal pulverizing mills have already been delivered, and the power house is nearing completion. The boilers, economizers and much of the equipment are already in place. A 1000-kw. turbine and a turbo-alternator set will be used to furnish power. A second kiln, doubling the plant capacity, will be installed, according to plans, within a short time after the mill gets into production.

Dewey Portland Cement Co., Kansas City, Mo., has awarded the contract for the erection of the structural steel work on its new plant at Davenport, Ia., to the McClintic-Marshall Co., Pittsburgh, Penn. Work will be begun at once, to be completed within six months. The Dewey Cement Co. has been steadily at work for several months putting in concrete footings and building its preliminary structures, installing tracks, and the like. The mill, when completed, will be a $2,000,000 project.

Cement Products

Tiffin Tile Co., Tiffin, Ia., owned by W. H. Herdlicka and H. J. Rich, has suffered a severe fire loss in its plant.

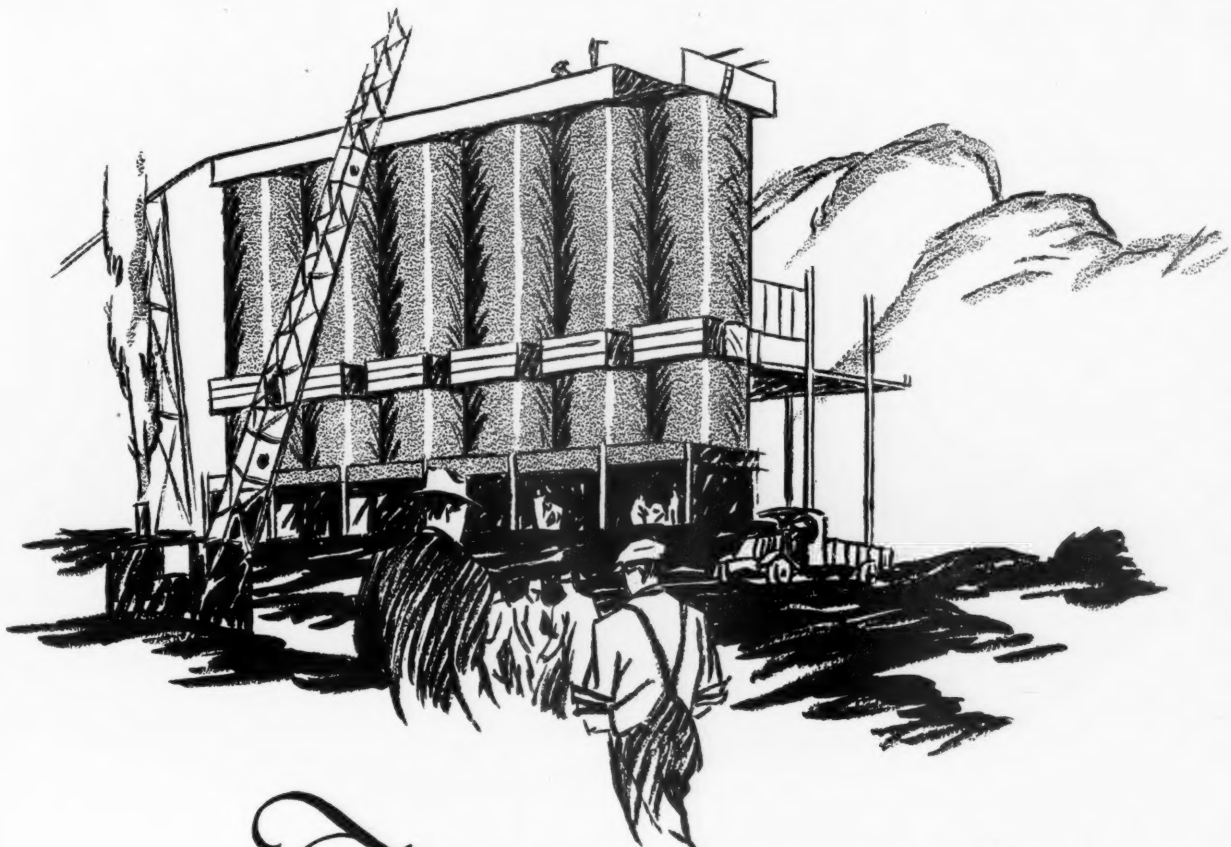
Northwestern Marble and Tile Co., 27th Ave. S. and 27th St., Minneapolis, Minn., is building a $2,000 frame warehouse.

Concrete Pressure Pipe and Construction Co., Gilroy, Calif., is planning the erection of a new plant for the manufacture of reinforced concrete pipe, to cost about $45,000 with equipment.

Houston Art Stone Co., Houston, Tex., has completed a 2-story addition to their cast stone plant. The company is enjoying good business and has recently shipped large orders for ornamental stone to outside cities. Charles Marini is the owner.

Varlee & Isensee, Sparta, Wis., announce the purchase of the cement block manufacturing department of the Madison Cement Stave Silo Co. The new owners will carry on the manufacture of cement blocks for all building purposes. The Madison Cement Stave Silo Co. will continue the manufacture of their cement stave silos.

Kalamazoo Cement Products Co., located in southeast Kalamazoo, Mich., on the line of the Grand Trunk railroad, has added a complete line of builders' materials. There are bricks in many grades, lime, plaster, glazed building tile, mortar colors and kindred items. These will be handled in addition to concrete blocks. This concern, organized in February, 1926, is doing a large busi-



The backbone of the plant

FAULTY, inefficient and expensive kilns are as fatal to the lime plant's successful operation as a faulty backbone to the human body's successful functioning.

"Arnold" Kilns are designed and built with full cognizance of the lime industry's most important problems. Their unvarying success is largely due to our long and intimate contact with hundreds of actual lime-producing operations.

Whether our responsibility covers only the installation of the kilns, or the engineering of the entire plant, you may be sure that "the backbone of the plant" will be **right.**

Arnold and Weigel

Contractors and Engineers

WOODVILLE, OHIO **U. S. A.**

ness and growing rapidly in production. A new storage warehouse is now being erected adjacent to the Grand Trunk siding. During the coming winter a new type of machine for the manufacture of cement blocks will be added to the concern's equipment.

Silica Sand

Maryland Quartz Co., Baltimore, Md., has acquired the interests of Nathan P. Pitcher, whose company has been handling quartz, flint and bitstone in various sizes. Additional capital will take care of contemplated improvements and expansion.

Rock Asphalt

Cherokee Rock Asphalt Co., Cherokee, Ala., has offered to furnish free of charge all rock asphalt material required to pave the driveways in the capitol grounds. Bids for the paving work were opened by the highway commission on October 19.

United Rock Asphalt Co., Albany, Ala., expects to have their new plant, now under construction near Flint, Ala., in operation within the near future.

Potash

French potash mines, a report reads, sustained their peak production level during June, 1926, when 109,500 metric tons were produced for sale, with a potash content of 30,500 tons. The total potash sales for the first six months of the year were 669,000 metric tons.

Martin Jarrett, Julian Levy and other Amarillo, Tex., business men are considering forming a company to finance the development of the potash beds in Terry county.

Berlin, Germany—An "all-German" potash trust in the form of a single corporation is being formed here, it is reported, with a probable capital of 300,000,000 marks.

Mrs. M. N. Armstrong, 415 Granite Bldg., Spokane, Wash., claims ownership of a lease on a large area of land located a short ways from where a diamond drill core recently revealed a commercial deposit of potash in Midland county, Texas, and has in turn sold leases to Mrs. Olive M. Milton and Mrs. Viola Davis, Spokane. The existence of the chemical deposits within a radius of several miles of the diamond drill hole was verified by the United States Geological Survey in conjunction with Dr. Schroch, director of the chemical experiment station, University of Texas, she says.

Personals

M. I. Dorfan

M. I. Dorfan has been appointed engineer of the dust collecting department of the Pangorn Corp. Hagerstown, Md. This department has been rceently extended as a specialized service unit to cover the requirements of dust arrester equipment in the stone, cement and other industries. Mr. Dorfan, formerly connected with the Allis-Chalmers Manufacturing Co. and other manufacturers of dust collectors, has had wide experience in this and similar fields.

Henry J. Gish has been made manager of the Blue Diamond mixed mortar department of the Stewart Sand Co., Kansas City, Mo. Mr. Gish succeeds L. E. Johnson, who left to take the directorship of the Finishing Lime Association. Mr. Gish is a graduate engineer, having received his degree from the University of Kansas in 1918. He also held a lieutenant's commission in the U. S. Engineers, and was formerly employed in Northwest Missouri.

F. E. Van Schaik, formerly sales manager of Norton Lime and Stone Co., of Cobblesville, N. Y., is now with the Solvay Process Co. of Syracuse, N. Y.

H. J. Schweim, chief engineer of the Gypsum Industries, Chicago, gave an interesting talk on gypsum to the Ohio building supply dealers at their recent gathering. After describing the usual methods of mining gypsum, Mr. Schweim explained the various uses made of it, mentioning particularly the new product, gypsum concrete, and how its use for exterior walls and partitions in small houses places fireproof construction within reach of the small purse. He also touched upon cellular gypsum and pointed out, as well, the advantages of gypsum in a fire.

James B. Johnson, Jr., was promoted to general traffic manager of the Consolidated Cement Corp. of America recently and will have offices in Chicago. Mr. Johnson was formerly traffic manager for the Signal Mountain Cement Co., Chattanooga, Tenn., and prior to that was connected for some years with the Southern railway.

Edward P. May, president of the Union Sand and Gravel Co., Huntington, W. Va., is preparing to have a $125,000 home erected within the near future. The house will be in the Old English style.

E. W. Russell has been appointed sales representative in Florida for the National Cement Co. Mr. Russell was formerly with the Atlas Rock Co., Miami, Fla.

Obituaries

Burt Kluttz and his brother Ray were both killed by a recent rock slide at a granite quarry in Rowen county, N. C. The men were working at a level about 25 ft. from the top of the quarry when a side wall of rock and dirt caved in and buried them. Both bodies were recovered.

Manufacturers

G. H. Williams Co., manufacturers of excavating buckets, have completed reorganization of the company management made necessary by the recent expansion. W. W. Cochrane has become general manager, J. D. Harter, sales manager, C. D. Buoy, chief engineer, and H. H. Neeve, superintendent.

Timken Roller Bearing Service and Sales Co., Canton, Ohio, announces the following appointments: Y. D. Hills, formerly Portland branch manager, to the position of manager of the Seattle, Wash., branch; R. H. Cross as assistant to G. G. McMullen, district sales manager, industrial division; E. N. Beisheim, formerly of the Bock Bearing Co., Toledo, Ohio, to the position of assistant general manager of the company, and S. C. Partridge, in charge of the Buffalo, N. Y., office of the Timken Roller Bearing Co., replacing Lee Warrender, resigned.

Hardinge Co., York, Penn., office at Salt Lake City, Utah, is now at the Continental Bank Building. W. L. Pennick is in charge. The company exhibit at the Power Show in New York City will include the Ruggles-Coles dryer, Hardinge conical mill, reverse current air classifier and the Hardinge super-thickener and clarifier.

Botfield Refractories Co., Philadelphia, Penn., announce the following new distributors for Adamant fire brick cement: Westwater Supply Co., 150 North Third St., Columbus, Ohio, in Columbus and vicinity; the Klinger-Dills Co., 129-131 North Jefferson St., Dayton, Ohio, for Dayton and vicinity: Coan Equipment Co., 236-242 Murray St., Fort Wayne, Indiana, Fort Wayne and vicinity, and the Cleveland Tool & Supply Co., 1427-1437 West Sixth St., Cleveland, Ohio.

Pennsylvania Pump and Compressor Co., Easton, Penn., have appointed Lee and Clark, 549 Washington Boul., Chicago, as their Chicago district representatives.

Mid-West Locomotive Works, Cincinnati, Ohio, recently conducted a public demonstration on a siding of the B. & O. R. R. at Cincinnati, to show the feasibility and economy of their new 8-ton gasolina locomotive, model **80GD**, for private switching of loaded cars.

McMyler-Interstate Co., Bedford, Ohio, have re-entered the steel fabricating field. An order for 600 tons of structural steel for the open hearth addition to the Otis Steel Co. plant at Riverside, Ohio, has been booked.

Chain Belt Co., Milwaukee, Wis., has started work on their new engineering building at West Milwaukee, Wis. The new building, 308x120 ft., will be equipped with modern machinery for the manufacture of conveyor, elevators, etc., and other general steel structural work. Every department connected with that part of the company's business will be housed in the new structure.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Traveling Grate Stoker. Catalog **C-4** on the Coxe traveling grate stoker showing typical installations and information on design, efficiency tests, performance charts, etc. COMBUSTION ENGINEERING CORP., New York.

Climax Engines. Bulletin I on the Climax engines listed by the Underwriters Laboratories. CLIMAX ENGINEERING CO., Clinton, Iowa.

Kennedy Gyratory Crushers. Bulletin on extracts from customers' letters issued by the KENNEDY-VAN SAUN MFG. CO., New York, N. Y.

Air Filters. Bulletin No. **2223**, illustrating and describing cellular air filter for industrial uses. Data on design, specifications, construction, installation and operation. AMERICAN BLOWER CO., Detroit, Mich.

"American" Shovel. Bulletin on "American" shovel, type "K," operated by steam or gas, for clamshell and general crane work. Construction data and details and illustration of design, uses, etc. AMERICAN HOIST AND DERRICK CO., St. Paul, Minn.

Osgood 1-yd. Shovel. Bulletin No. **2620** on the 1-yd. heavy duty gas or electric shovel. Construction details, capacities, data on working ranges, specifications, etc. THE OSGOOD CO., Marion, Ohio.

Fire Brick Cement. Broadside outlining the uses and advantages of Adamant fire brick cement for lining rotary cement kilns. BOTFIELD REFRACTORIES CO., Philadelphia, Penn.

Drill Sharpener. Bulletin No. **72-J**, describing and illustrating Sullivan Class A drill sharpener for hammer forging drill bits and shanks. SULLIVAN MACHINERY CO., Chicago, Ill.

Winter Building on Increase, Says Association

THE amount of building during the winter is slowly but surely increasing, according to the Portland Cement Association, in a story which appeared recently in the New York *Journal of Commerce*. Its own building at Chicago is itself considered an interesting voucher for the favorable results of cold weather construction. Bradstreet's survey shows that the value of December, 1925, contract awards was 8.7% above December, 1924.

The winter slump in building is largely a matter of habit, says the Portland Cement Association. Up until a score of years ago building in winter was almost unknown. At that time the builder did not understand how to use concrete successfully in winter, a knowledge that is now necessary, for concrete enters into practically all forms of construction. So when methods of accomplishing first class concrete work in cold weather were developed, builders were slow in taking advantage of them because of the winter "let-down" habit which has been so long established.

However, the contractor is beginning to realize more and more that building in winter means not only helping to keep the prosperity of the community on an even keel by giving employment to his men the year around, but it also means the actual saving of time and money for himself.

Automobiles Increase in 1926

IN spite of almost daily predictions that a slump in the automobile industry was at hand, the number of cars made in the first nine months of 1926 is almost as many as were made in all 1925. The increase for the nine months' period of 1926 over the same period of 1925 was 11½%. There were 3,696,490 cars made in 1925 and if the present rate for 1926 is kept up the year's production will be more than 4,000,000 cars. The figures of production are from a Department of Commerce report.